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2000

EPA Superfund
Record of Decision:

NORMANDY PARK APARTMENTS
EPA ID: FLD984229773
OU 01
TEMPLE TERRACE, FL
05/11/2000

RECORD OF DECISION

Declaration

Site Name and Location

Normandy Park Apartments
Temple Terrace, Hillsborough County, Florida

Statement of Basis and Purpose

This decision document presents the selected remedial action for the soil and groundwater at the Normandy Park Apartments site, in Temple Terrace, Hillborough County, Florida, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the administrative record for the Normandy Park Apartments site. The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has reviewed the reports which are included in the administrative record for the Site. In accordance with 40 CFR 300.430, as the support agency, FDEP has provided EPA with input on those reports. The State of Florida concurs with the selected remedy.

Assessment of the Site

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Description of the Selected Remedy

This remedy addresses threats to the soil and groundwater posed by the environmental conditions at this Site.

The major components of the remedy include:

- excavation of the top two feet of exposed soil around the entire apartment complex which will be replaced with clean fill and sodded;

  Exception: *The soil around the existing trees will not be excavated to prevent from damaging the trees. Exposure to soil around trees will be prevented by placing a brick or tile plaza around each tree with precast concrete or metal tree grate.*

- removal of the wooden deck in the southern complex and excavation of soil to the water table (7-8 feet) beneath the deck which will be replaced with clean fill and sodded;

- on-site screening of excavated soil in the open field behind the apartments;

- on-site treatment of the soil via ex-situ stabilization based on the results of on-site screening;

- off-site disposal of the treated soil in a regulated landfill;

- monitored natural attenuation of the groundwater contaminants; and

- institutional controls to limit future use of soil and groundwater.

Because lead is ubiquitous throughout the complex, the cleanup strategy is to remove all exposed surface soil regardless of the contaminant concentrations present. The existing buildings, parking lots, sidewalks, and other structures prevent direct exposure to contaminants underneath. Therefore, with removal of the exposed surface soil in the complex and institutional controls to require that the contaminants underneath the structures be addressed in the future if the structures are removed, the potential for both current and future direct contact is addressed. Additional soil will be removed (7-8 feet) in the southern complex. After the removal of this source, natural attenuation is expected to address the exceedances of the drinking water standards. EPA considers this to be the final remedial action. Therefore, no additional operable units are expected.

Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

As much as is practicable, this remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after the initiation of remedial action to ensure the remedy is, or will be, protective of human health and the environment.

ROD Data Certification Checklist

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this Site.

- The primary concerns at the Site are the frequency and concentration of lead found in the soil. In the 118 soil samples taken in the Remedial Investigation, lead was detected 112 times at a maximum concentration of 38,000 mg/kg. Concentrations varied areally and vertically with the highest concentrations being present beneath the wooden deck in the southern courtyard. Cadmium, antimony, and arsenic were also detected in the soil samples and are contaminants of concern.

- In the groundwater, lead was detected in 4 of the 12 monitoring wells sampled. Two of these samples exceeded the drinking water standard for lead of 0.015 mg/l. The maximum concentration detected was 0.24 mg/l. Antimony was detected in 5 of the 12 wells sampled. All 5 of these samples exceeded the drinking water standard for antimony of 0.006 mg/l. The maximum concentration of antimony detected was 0.11 mg/l. All groundwater exceedances occurred in the surficial aquifer. The highest lead and antimony groundwater concentrations were found in the area of the southern courtyard where the highest soil concentrations of lead and antimony were found.

- A risk assessment was conducted to determine the potential current and future risk for adults and children during long-term unrestricted residential activities and adults during short-term occupational activities based on the lead concentrations in the soil. The risk assessment did not evaluate the other contaminants of concern in the soil (i.e., cadmium, antimony and arsenic) and did not evaluate the groundwater as a potential drinking water source. However, the risk assessment was approved, even though it was incomplete, because it was determined that the deficiencies noted in the risk assessment would not affect the selection of the remedy nor the remedy's level of protection to human health or the environment. All evaluated remedies involve removal of the surface soil at the apartments regardless of contaminant concentration. Therefore, revising the risk assessment to calculate specific cleanup goals for all contaminants of concern in the surface soil was determined to be unnecessary.

- Based on the analysis of lead in the soil, the risk assessment developed a cleanup level of 420 mg/kg for surface soil. Since the top 2 feet of all exposed soil throughout the complex will be excavated, with the exception of around the trees where grating will be placed to prevent direct exposure, cleanup goals for the other soil contaminants are not necessary. The cleanup levels for groundwater at the Site are 0.006 mg/l for antimony and 0.015 mg/l for lead. These cleanup levels are based on the Federal and State of Florida primary drinking water standards for these chemicals and will be used to measure the effectiveness of natural attenuation.

- After successful implementation of the selected remedy, the soil and groundwater will be remediated to levels that do not pose unacceptable current or future risks to human health or the environment. Current land use is residential. The future land use of the Site is also assumed to be residential.

- The cost of the remedy was estimated over a 30 year period. The total estimated capital and indirect costs for the remedy was $3,066,126 and the total monitoring and O&M costs was $72,092. This results in an overall total present worth cost of $3,138,218.

- The selected remedy was chosen because it represents the most effective remedial strategy taking into consideration effectiveness versus cost.

Richard D. Green, Director
Waste Management Division

11 MAY 00

Date

RECORD OF DECISION

Summary of Remedial
Alternative Selection

for the

Soil and Groundwater

at the

Normandy Park Apartments
Temple Terrace
Hillsborough County, Florida

Prepared by the
United States
Environmental
Protection Agency

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1.0 SITE LOCATION AND DESCRIPTION

The Normandy Park Apartments Site (CERCLIS # FLD984229773) is located at 11110 N. 56th Street, approximately 1/4 mile south of the intersection of Fowler Avenue and 56th Street, in Temple Terrace, Hillsborough County, Florida (Figure 1-1). The Site, which comprises about 8.25 acres, was previously the location of a battery recycling and secondary lead smelting facility until a 144 unit apartment complex was built on the property in 1970. The Site is located in a mixed commercial and residential area just northeast of Tampa. Gulf Coast Recycling (GCR) currently owns the property and has owned it since 1953. Previous investigations and cleanup activities have been conducted by GCR with EPA oversight.

The layout of the apartment complex is shown on Figure 1-2. The northern courtyard consists of 80 residential units in 8 buildings and the southern courtyard consists of 64 residential units in 4 buildings. There is a tennis court, playground, and sandbox in the northern courtyard and a laundry facility in the southern courtyard. Both courtyards have a swimming pool. A wooden deck currently covers most of the southern courtyard. This deck was erected, under an EPA removal order, as a temporary measure to limit the potential for exposure to the lead contaminated soils underneath.

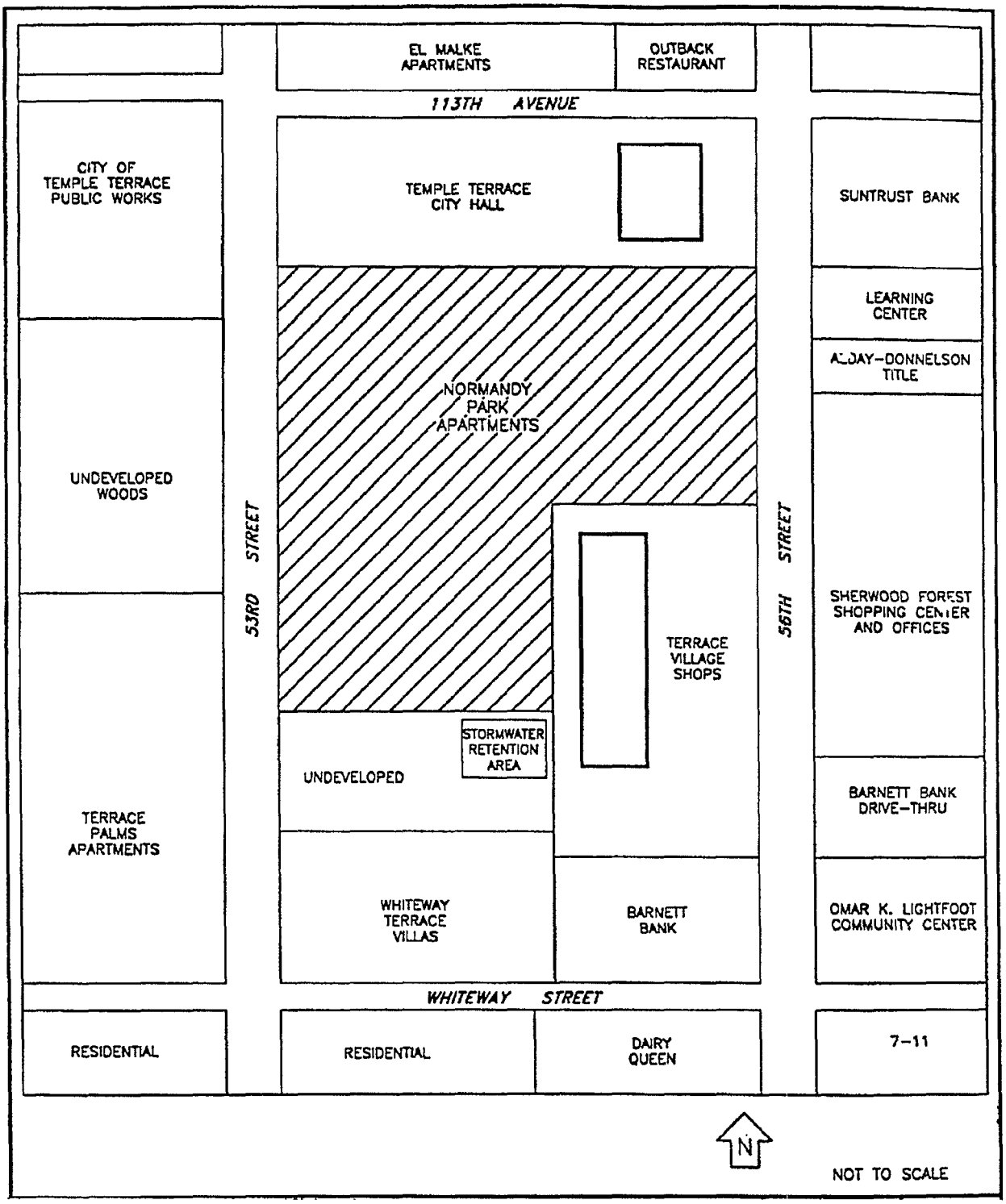


Figure 1 - 1 Site Location

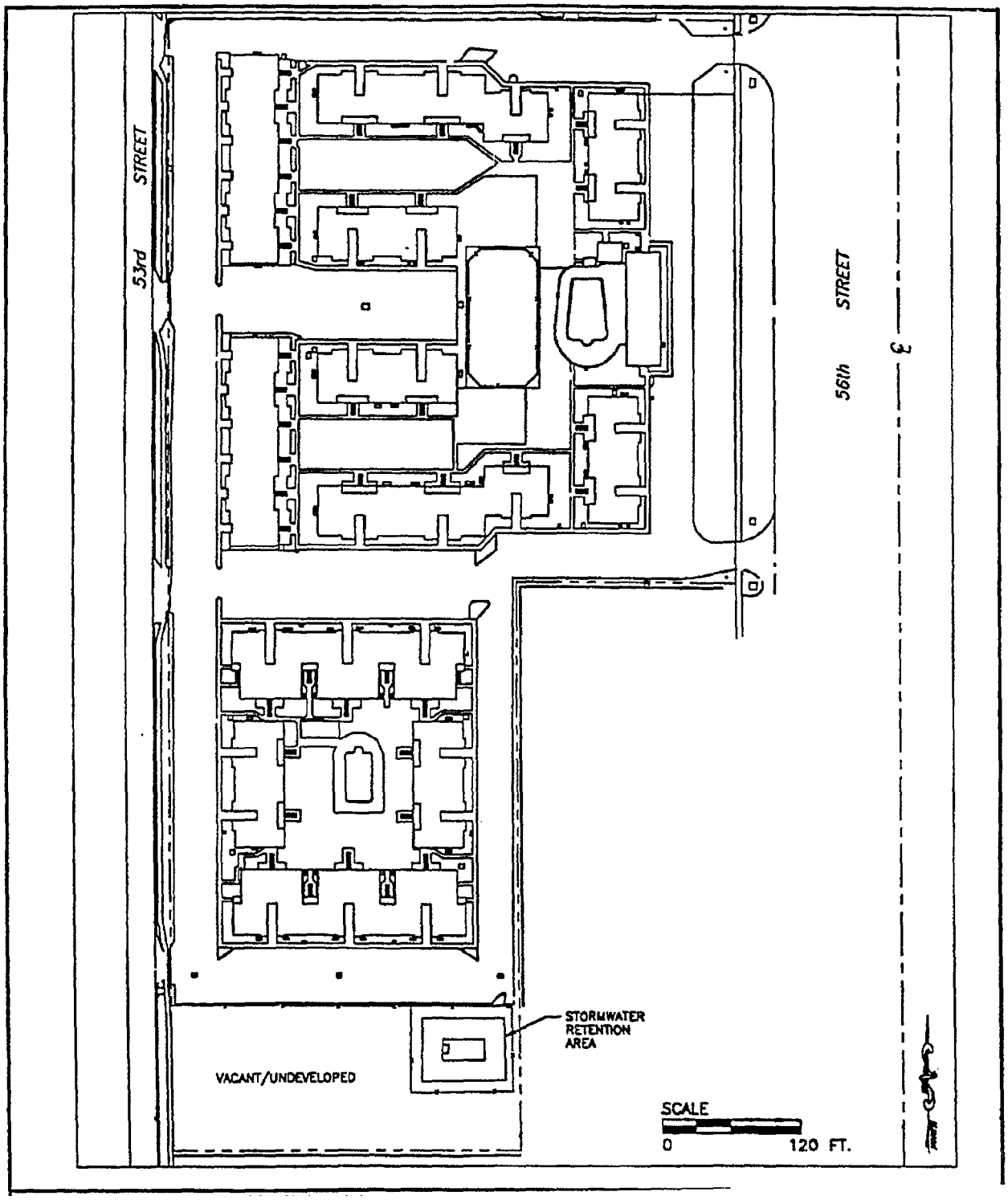


Figure 1 - 2 Site Layout

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

From 1953 until 1963, GCR operated a battery recycling and secondary lead smelting facility at the Site. At the facility, the tops of spent lead batteries were chopped off by a hydraulic guillotine or cracked open by some other means. The lead plates were separated and processed for recycling, and the battery casings and solid components were crushed and disposed. The lead plates were smelted on-site. This process resulted in the release of sulfuric acid and lead into the environment.

In 1970, GCR built the Normandy Park Apartments on the property. In August l991, in response to a citizen's complaint, the Hillsborough County Environmental Protection Commission investigated the Site. Sampling revealed the presence of lead in soil up to 35,000 mg/kg and in groundwater up to 16.7 mg/l. In January 1992, private blood test results for 3 children living at the apartments were publicized. The blood lead concentrations were reportedly 9, 10, and 12 micrograms per deciliter (ug/dl) per unit of whole blood. Two of the three children's blood level results were slightly above or equal to the Centers for Disease Control recommended level of 10 ug/dl lead per unit of whole blood. In February 1992, the Florida Department of Environmental Protection (FDEP) referred the Site to EPA. EPA sampling confirmed widespread lead contamination throughout the Site in levels that threaten human health and the environment.

In June 1992, GCR entered into an Administrative Order on Consent (AOC) with EPA to abate the immediate threat. Under the direction of EPA's Emergency Response and Removal program GCR placed concrete caps over two lead contaminated areas in the northern courtyard and built a wooden deck over the entire southern courtyard to prevent direct contact with contaminants pending the development and implementation of a more permanent remedy. The deck was completed in October 1995.

In February 1995, the Site was proposed for inclusion on the National Priorities List (NPL). To date, EPA has used its enforcement discretion to defer placing the Site an the NPL in exchange for GCR's cooperation.

On May 12, 1998, EPA issued a special notice letter to GCR to conduct a Streamlined Remedial Investigation (SRI), Focused Feasibility Study (FFS), and Risk Assessment at the Site. Negotiations with GCR were successful and in September 1998, GCR entered into another AOC with EPA to conduct the SRI/FFS. The investigation was streamlined due to the fact that much past data existed to evaluate the nature and extent of contamination.

3.0 COMMUNITY PARTICIPATION

The SRI and FFS reports and proposed plan for the Normandy Park Apartments were made available to the pubic in February 2000. They can be found in the Administrative Record file and the information repository maintained at the EPA Docket Room in Region 4 and at the Temple Terrace Public Library. The notice of availability of these documents was published in the Tampa Tribune on Sunday, February 13, 2000, and in the Temple Terrace News on February 16, 2000. The proposed plan was made available to the public on February 17, 2000. A public comment period was held from February 17, 2000, until March 17, 2000. In addition, a public meeting was held on March 9, 2000, to present the proposed plan to the community. At this meeting, representatives from EPA, the Florida Department of Environmental Protection, and Florida Department of Health answered questions about problems at the Site and the remedial alternatives. EPA's response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision.

Gulf Coast Recycling (GCR) has worked cooperatively with EPA since the beginning of EPA's involvement to successfully conduct community relations at the Site. In addition, EPA and the Florida Department of Health have issued many fact sheets and conducted meetings to answer questions and keep residents informed of upcoming activities. Below is a summary of the public meetings held at the apartments since the Site was initially deferred to EPA.

- On April 9, 1992, EPA held its first public meeting at the apartments to explain the temporary cleanup plans and address the health concerns for the Site. During this meeting, GCR offered free blood lead tests to Normandy Park residents and paid for collection and analysis. The meeting was well attended by the residents.

- On February 10, 1993, EPA held two information sessions at the apartments. At these information sessions, EPA answered questions from residents on the initial emergency response actions and discussed EPA's future planned activities. This meeting was also attended by representatives from the federal Agency for Toxic Substances and Disease Registry, state and local health departments, and Gulf Coast Recycling.

- In August 1995, the Florida Department of Health held a public meeting at the apartments to discuss the initial public health assessment developed for the Site.

- On November 12, 1998, EPA held an informational open house at the apartments to discuss the final public health assessment and to inform the residents of the upcoming remedial investigation. The public health assessment concluded that the Site poses no apparent health risk. Resident turnout was very low.

- On June 30, 1999, EPA approved the community relations plan for the Site which outlines the community relations activities appropriate to meet the affected community's needs.

4.0 SCOPE AND ROLE OF ACTION

In 1992, an emergency response and removal action was taken at the apartment complex to address the immediate threat posed by high levels of lead in the soil. Concrete caps were placed over highly contaminated areas in the northern complex. In 1995, a wooden deck was constructed over the southern complex to prevent potential exposure to the soil underneath. The remedy selected for the Site in this Record of Decision will leave the concrete caps in place in the northern courtyard but will require the removal of the wooden deck in the southern courtyard.

The remedy in this Record of Decision was selected with the intention of eliminating the unacceptable risks to residents while minimizing the impact on their lives, Even though no data is available, it is likely that contamination exists underneath the buildings on-site at levels above the cleanup goals. To remediate this soil would likely require demolition of the existing buildings and would displace many residents. These buildings and other structures, such as parking lots, prevent the potential for direct exposure to the contaminated soil underneath. The selected remedy, therefore, focuses on the exposed soil in the apartment complex that residents have the potential to come in contact with and on the exceedances of lead and antimony in the groundwater. Lead contamination is ubiquitous throughout the site soils even though the highest concentrations were found in the southern courtyard where the majority of the operations took place. Therefore, to be most protective, the selected remedy addresses all exposed surface soil throughout the apartment complex. Additionally, the selected remedy will require that the soil in the southern complex, which is the location of the most highly contaminated soil and groundwater, be excavated to the water table (7-8 feet) to allow the levels of lead and antimony to naturally attenuate to below the cleanup goals.

To follow is the overall site cleanup plan:

- Excavate the top two feet of exposed soil around the apartment complex and replace with clean fill and sod. The soil around the existing trees will not be excavated to prevent from damaging the trees. Exposure to soil around trees will be prevented by placing a brick or tile plaza around each tree with a precast concrete or metal tree grate.

- Remove the wooden deck in the southern complex, excavate to the water table (7-8 feet) beneath the deck, and replace with clean fill. The intention of this portion of the remedy is to remove as much of the highly contaminated soil in the southern complex as technically practical without affecting the structural integrity of the existing buildings and swimming pool. The removal of this highly contaminated soil is necessary because it is believed to be acting as a source of groundwater contamination.

- Take all excavated soil to the open field behind the apartments and screen the soil to determine the appropriate level of treatment necessary.

- Treat the contaminated soil via stabilization based on the screening results and take it off site for disposal.

- Install additional monitoring wells necessary to monitor the progress of natural attenuation of the groundwater contaminants.

- Use institutional controls to limit future use of soil and groundwater and to inform future owners of the requirements necessary to address contamination under buildings if the buildings are ever demolished.

5.0 SITE CHARACTERISTICS

5.1 Site Area

The 144 unit apartment complex, which is approximately 8.25 acres, has structures and facilities common to apartment complexes. The apartments are two story apartment buildings built in clusters with courtyards in the center (Figure 1-2). The courtyards are generally covered with grass and contain many trees, with the exception of the southern courtyard which is completely covered with a wooden deck. There are also parking lots, two swimming pools, an apartment clubhouse, a laundry facility, and playground located at the apartment complex. A vacant, undeveloped lot is present at the extreme southern edge of the property. A stormwater retention pond is located at the southeast corner of the Site to collect stormwater from underneath the deck in the southern complex.

The apartments are located in a mixed commercial and residential area just north of Tampa, Florida. The apartments are bounded on the north by the Temple Terrace City Hall, to the west by an undeveloped lot and the Terrace Palms Apartments, to the south by an undeveloped lot owned by GCR, and to the east by a retail strip shopping center (Figure 1-1).

5.2 Geology and Hydrogeology

The geology in the site area generally consists of the following features beginning at the surface: a surficial zone, a low permeability clay layer, an intermediate zone, a sed-confining clay layer, and a karst limestone zone. The surficial zone contains mostly sand with varying amounts of organic debris and silt. The saturated portion of the surficial zone is referred to as the surficial aquifer. At the Site, the groundwater of the surficial aquifer is first encountered at about 7-8 feet below ground surface (bgs). The surficial aquifer is about 25-30 feet thick. Below the surficial aquifer is the intermediate zone which is about 70-75 feet thick and consists mainly of interbedded clay and clay rich sediments with a thin limestone layer. Below the intermediate zone, at about 100 feet bgs is the Floridan aquifer, which consists of the karst limestone zone and is the drinking water source for much of western Florida.

5.3 Sampling Strategy

Based on past data, it was known that the primary contaminants present at the Site were lead, arsenic, cadmium, and antimony. These metals had been detected in past sampling events at various levels in the soil and groundwater throughout the Site. Therefore, the overall sampling strategy was designed to determine the distribution of these metals in the soil and groundwater and to confirm that no other contaminants were present at levels of concern. However, this investigation was limited to exclude soil sampling underneath the existing buildings due to the fact that the buildings prevent exposure to the soil underneath and past groundwater sampling did not indicate widespread groundwater contamination.

Due to the extensive amount of data that had been collected in previous investigations, the first step was to summarize and determine the quality of the past data and identify any data gaps that needed to be filled. After review of the past data, it was determined that for soil sampling, composite soil samples taken at 3 depth intervals would provide more accurate results than discrete soil samples for determining the distribution of metals in the soil. For groundwater it was decided that 5 additional surficial aquifer wells would be added to the 4 surficial aquifer wells and 3 Floridan aquifer wells to better understand contaminant levels and groundwater trends.

5.4 Soil Contamination

In order to confirm that no other contaminants were present at levels of concern at the Site, five composite soil samples were collected and analyzed for Contract Laboratory Program (CLP) Target Compounds and Analytes commonly referred to as a full scan analysis. The CLP samples were analyzed for metals, pesticides, volatile organic compounds, semi-volatile organic compounds, polychlorinated biphenyls (PCBs), and cyanide. The locations of these soil samples are found in appendix A, figures A-1 north and A-1 south. In addition to the 5 composite samples taken for CLP analysis, 113 composite soil samples were collected from 48 locations (appendix A, figures A-2 north, A-2 south, A-3 north, A-3 south, A-4 north & A-4 south). These samples were taken at various depths including at the surface (0-1 foot), just above the water table (around 7-8 feet) and at a midpoint between the surface and the water table. The samples were analyzed for target metals (lead, cadmium antimony, and arsenic) based on the results of the full scan analysis and the past data collected.

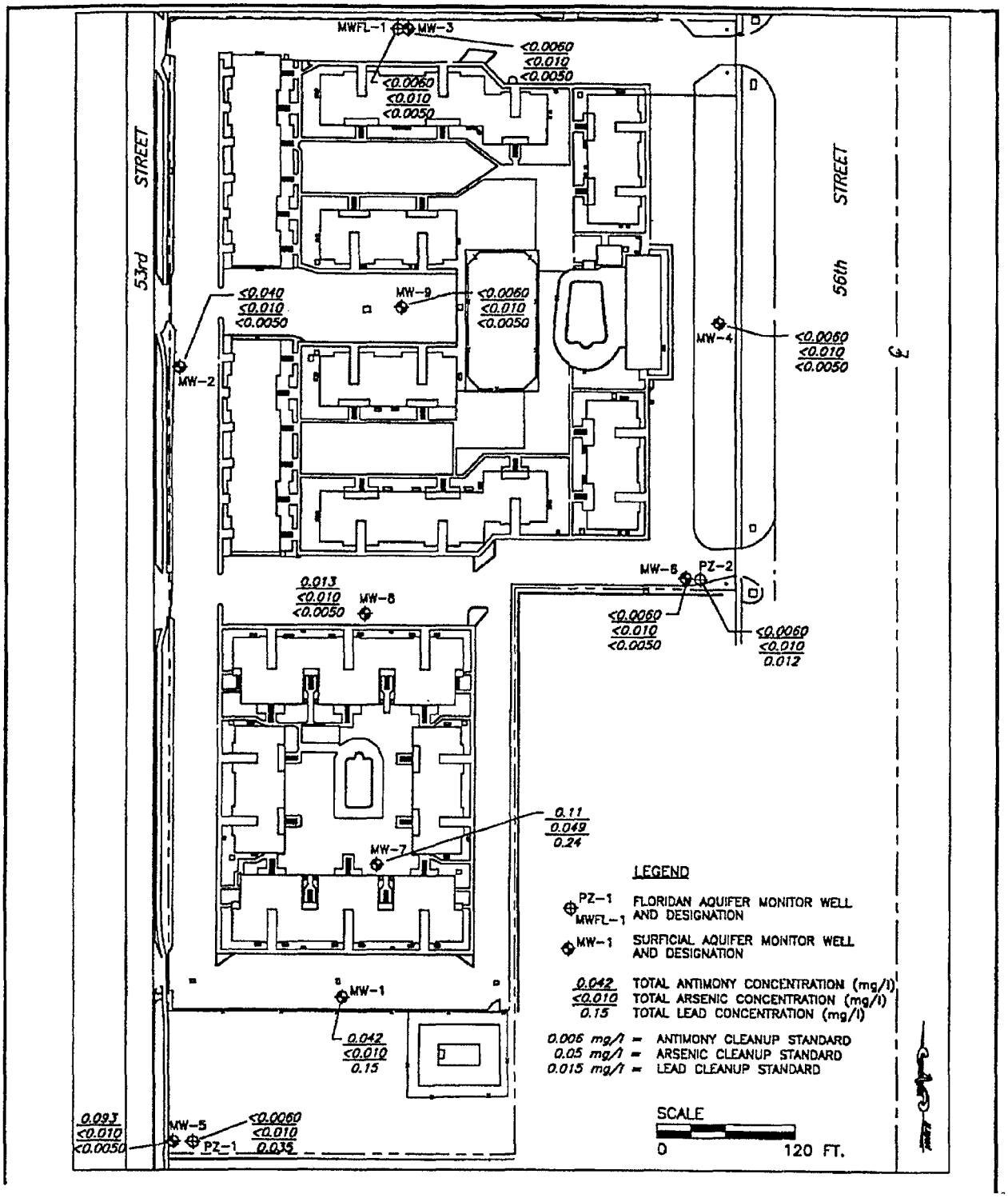
Lead, cadmium, antimony, and arsenic were found in soil samples collected across the complex. These contaminants were found at various depths, with the concentrations generally decreasing with depth with the exception of the southern courtyard. A summary of the analytical results can be found in appendix A, tables A-1 and A-2. Lead was the contaminant most commonly found in the samples and was found at the highest concentrations. The areas with the highest concentrations of lead were found in the southern courtyard, underneath the wooden deck, and the southern half of the northern courtyard. Lead was detected in all of the surface (from 0 - 1 foot) and midpoint samples (between surface and water table) and in all but six of the water table samples. During the 1998 soil sampling event, concentrations of lead were detected in the soil at levels ranging from below the detection limit of 5 mg/kg to 38,000 mg/Kg. The highest lead concentrations were found in the areas where buried battery casing pieces were encountered and in the southern courtyard. By comparing these data with previously collected lead data, it was determined that lead is present throughout the Site at levels above the cleanup goals. It was also determined that the concentrations of lead varied greatly throughout the surface soil.

5.5 Groundwater Contamination

The primary groundwater contaminants at the site are lead and antimony. Both were detected in the surficial aquifer at concentrations above the state and federal primary drinking water standards of 0.0 15 mg/l for lead and 0.006 mg/l for antimony. The locations of the monitoring wells and the results of the remedial investigation groundwater sampling are shown on figure 5-1. The contamination appears to be limited to the surficial aquifer. During the remedial investigation, lead was detected above the drinking water standard in one Floridan monitoring well (PZ-1). However, upon review of the field notes, the sample exceeded the acceptable turbidity level and was therefore in question. The well was resampled using proper low flow techniques and lead was not found above the detection limit of 0.005 mg/l. Therefore, the focus of the groundwater component of this remedy will be to remediate the lead and antimony in the surficial aquifer and continue to sample to ensure the contaminants do not migrate into the Floridan aquifer or move off site,

The southern complex was the location of most of the historical battery recycling operations. Therefore, as expected, the highest contaminant levels in the soil and groundwater were found in the southern courtyard and in the southern portion of the northern complex. The highest concentrations of lead and antimony were detected in monitoring well MW-7, a surficial groundwater monitoring well located in the southern courtyard. The levels of lead and antimony detected in MW-7 were 0.24 mg/l and 0.11 mg/l respectively. In MW-1, which is located just downgradient of MW-7, the concentrations of lead and antimony decrease to 0.15 mg/l and 0.042 mg/l respectively. These two monitoring wells were the only monitoring wells where lead exceeding the drinking water standard of 0.015 mg/l and were the two monitoring wells with the highest exceedances of antimony.

Antimony, exceeding 0.006 mg/l, was also detected in monitoring wells MW-5, MW-8, and was possibly in MW-2. When the sample for MW-2 was analyzed, the detection limit was 0.040 mg/l. Since the antimony drinking water standard is 0.006 mg/l, and therefore, below the detection limit, it cannot be determined whether or not antimony exceeds the cleanup goal in this well. In these three monitoring wells, lead was surprisingly not detected above the detection limit of 0.005 mg/l. To evaluate the antimony detected in the MW-5 and MW-8 samples, these wells will be further investigated during the remedial design and the remedial action through sampling of both existing wells and additional wells to be installed as part of the natural attenuation monitoring network. The existence of antimony in MW-2 must first be verified. The concentrations of antimony detected in MW-5 and MW-8 are low and may be naturally attenuating, If this effort does not adequately characterize the antimony in these areas, then additional investigation may be necessary to determine the source of these exceedances.



Groundwater Monitoring Well Locations &
Sampling Results

6.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Land Uses

Current land use is residential. The Normandy Park Apartments is a 144 unit apartment complex located on the Site. It is expected that future land use at the Site would most likely continue to be residential. The surrounding area is a mixture of commercial and residential.

Groundwater Uses

Locally, private water-supply wells are not known to be present which use groundwater as a drinking water source. The area has been developed for many years and municipal water is supplied. Future use of groundwater in the area is anticipated to remain the same.

The Floridan aquifer, which is first encountered approximately 100 feet below the ground surface at the Site, is a significant source of drinking water for this area of Florida. Even though direct contact to soil contaminants is the main concern at this Site, potential releases of Site contaminants to the Floridan aquifer are also of concern. Groundwater monitoring to ensure natural attenuation of Site contaminants will also be used to ensure Site contaminants do not migrate off-site.

7.0 SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks the Site poses if no action is taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for this Site.

Based on the results of the risk assessment and on comparison of the detected contaminant concentrations to enforceable, health based standards, site-related contaminants are present in the surface soil and groundwater at the Normandy Park Apartments Site in concentrations which pose significant noncarcinogenic risks to human health. At many locations throughout the Site, the on-site surface soil contains concentrations of lead above the acceptable level, as determined by the risk assessment, of 420 mg/kg. In addition, antimony and lead are present in the on-site surficial groundwater at levels exceeding their respective drinking water standards of 0.015 mg/l for lead and 0.006 mg/l for antimony. The response action selected in this Record of Decision is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

7.1 Human Health Risk Assessment

In January and February 1992, prior to the initial removal action at the Site, blood samples were collected from 24 adult and 38 child residents of the apartment complex and analyzed for blood lead levels. Only three children and one adult exhibited blood lead levels in excess of the 5 ug/dL detection limit, and no individuals had blood lead levels that exceeded the typical targets of 10 ug/dL for children and 30 ug/dL for adults.

In April 1999, the *Focused Baseline Human Health Risk Assessment* was developed for the Normandy Park Apartments Site. To evaluate the risk to human health associated with contamination from the Site, analytical data for on-site and off-site groundwater and on-site surface soil and subsurface soil collected during the Streamlined Remedial Investigation (SRI) was evaluated to develop a fist of Chemicals Of Potential Concern (COPCs). The result of this evaluation determined that the COPCs for the site were lead, antimony, and arsenic in the surface and subsurface soil and lead, antimony, arsenic, and cadmium in the surficial aquifer.

The risk assessment assumed that since lead was most prevalent and present at the highest concentrations, any action taken to abate the unacceptable risks from direct exposure to lead contaminated soil would also address any unacceptable risks to the other Site contaminants present in the soil. Therefore, the risk assessment only assessed potential exposure, via direct contact, to lead in the soil using the *Integrated Exposure Uptake Biokinetic Model* (IEUBK) for exposure to lead.

The IEUBK was run with the mean and 95% Upper Confidence Limit (UCL) detected concentrations of lead in surface soil in the north and south complex. Using the mean concentration of 357 mg/kg lead in surface soil in the north complex did not result in a blood lead level above 10 ug/dL for any age group. The 95% UCL concentration of 1,388 mg/kg in surface soil results in a level that slightly exceeded the 10 ug/dL in children 1-3 years of age. Using the mean concentration of 2,500 mg/kg lead in the surface soil of the south complex resulted in a potential blood lead level above 10 ug/dL for children 0.5 to 6 years of age. Likewise, using the 95% UCL surface soil concentration of 4,190 mg/kg resulted in a potential blood lead level above 10 ug/Dl for children from 0.5 to 7 years of age.

Therefore, based on these IEUBK results, lead concentrations in soil at both the north and south complex represents a potential risk to child residents from ages 0.5 to 7 years. Using this information, 420 mg/kg was determined to be the maximum lead concentration in the surface soil that corresponded with an acceptable risk.

By assuming that lead was the primary COC, the baseline risk assessment failed to evaluate the risks from other COC concentrations in the soil (i.e., arsenic, cadmium, and antimony). Additionally, the risk assessment failed to evaluate the surficial aquifer as a potential drinking water source. EPA identified these deficiencies to Gulf Coast Recycling (GCR) and requested that the risk assessment be revised. In response to EPA's comments, GCR proposed not to revise the risk assessment but to take another approach. They proposed removing the entire surface soil pathway, regardless of contaminant concentrations, to be most protective, Therefore, it was unnecessary to determine acceptable concentrations of other COC's since all surface soil would be removed and replaced with clean fill. EPA agreed that revising the risk assessment would not affect the selection of the remedy and therefore, approved the incomplete risk assessment because it was sufficient for EPA's purposes, Contaminant concentrations in the surficial aquifer were compared to the enforceable drinking water standards to determine groundwater COC's. This showed that lead and antimony were the COC's for groundwater. Institutional controls, in the form of deed notices, will be used to ensure the contaminants underneath the existing structures are addressed in the future, if the land use changes.

7.2 Environmental Risks

The ecological risk assessment for Normandy Park Apartments evaluated potential impacts of site-related constituents to wildlife living at the site. The habitat for wildlife at the 8.25-acre apartment complex consisted of maintained lawns with many trees. The area of the complex not covered by buildings or parking lots was roughly 1.2 acres. While the site itself does not provide substantial habitat for wildlife, the 70-acre Takomah Trail Park is within one-half mile of the apartment complex and does provide substantial habitat. Takomah Trail Park consists of an 8-acre pond with a freshwater marsh fringe, forested areas, and maintained lawn/playgrounds shaded by mature oak and hammock trees. There is no evidence that site-related constituents are migrating to the park. However, wildlife from the park might visit the apartment complex. Since the park and the apartment complex differ in habitat and because they are separated by busy

roadways, crossing residential and commercial development, it is unlikely that wildlife from the park will be regular visitors.

Birds and mammals tolerant of human activity were known or suspected to frequent the grounds of the apartment complex. Birds potentially present included the common grackle, American robin, northern mockingbird, northern cardinal, European starling, house sparrow, and house wren. Mammals potentially present included small mammals such as the raccoon, mice, rats, and shrews. No threatened or endangered species are expected to use the apartment complex grounds.

The ecological risk assessment for the site evaluated the potential ecological effects to resident songbird populations. Songbird populations were chosen as the focus of the assessment because of their presence on site, their potential for exposure to site-related constituents through their diet, and their sensitivity to the main constituent of concern at the site-lead in soil. The ecological risk assessment sought to answer the risk question of whether contaminant levels in site soils would impact reproduction of songbirds exposed through ingestion of site-related metals sequestered in the bodies of invertebrates in contaminated soils. The assessment endpoint for the ecological risk assessment was identified as vermivorous, or worm-eating, birds after the most familiar soil invertebrate, the earthworm.

Table 7-1 shows the calculations of exposure dose for the vermivorous bird, represented by the American robin. The exposure dose is characterized by the no observed adverse effect level (NOAEL) and the Lowest Observed Adverse Effect Level (LOAEL) in Table 7-2. The hazard quotients for vermivorous birds exposed to a conservative estimate of average site concentrations ranged from 40 for the NOAEL to 14 for the LOAEL. Hazard quotients greater than 1 for the vermivorous bird indicate that lead levels in the soil at Normandy Park Apartments would result in potential unacceptable risk of impaired reproduction in songbirds if no action were
taken.

The last column of Table 7-2 shows a protective range of 110 to 320 mg/kg for lead. The protective levels calculated for the American robin are conservative and commensurate with values calculated for protection of human health. The major uncertainties in these calculations are the degree to which songbirds utilize this site and the degree to which lead accumulates in the diet. The rate of utilization of the site by songbirds is unknown. The habitat at the site is broken up into small strips and courtyards around buildings, which might not provide the same habitat as a contiguous area. Conservative literature values were used in the assessment for the American robin's home range in absence of site-specific information. Moreover, the calculations depend on the degree to which lead in soil is taken up by the earthworms. A management decision was made not to collect site-specific tissue concentrations in earthworms, due to the limited wildlife habitat. In absence of site-specific information, conservative literature values were used in the assessment for bioaccumulation factors. The assumptions might over- or underestimate actual risk at the site. Due to the uncertainty in exposure assumptions and the fact that the American robin is used to represent several different types of birds, the preliminary remedial goals for lead are not

TABLE 7-1

Exposure Assessment for Vermivorous Songbirds
Normandy Park Apartments
Temple Terrace, Florida

Lead Concentration [1] mg/kg (C_{soil})	Soil-To-Soil Invertebrate Accumulation Factor [2] (BAF_{inv})	Soil-To-Plant Accumulation Factor [3] (BAF_{plant})	Ingestion Rate, IR, kg/day [4]	Fraction of Diet Soil Invertebrates [5] (F_{inv})	Fraction of Diet Plants [5] (F_{plant})	Fraction of Diet Incidental Ingestion of Soil [5] (F_{soil})	Body Weight, BW, Kg [6]	Site Foraging Factor [7] (SFF)	Exposure Dose, mg/kg day [8]
4,407	0.085	0.009	0.0688	0.49	0.49	0.02	0.0773	0.6	155

[1] 95 % upper confidence limit (UCL) on the mean concentration of lead in all samples, lognormal distribution assumed
[2] USEPA 1985 average of three values adjusted from dry weight to wet weight by assuring worms were 80% water
[3] Baes et al., 1984 adjusted from dry weight to wet weight by assuming worms were 80% water
[4] Assuming the American robin ingests 89 percent of its body weight per day = 0.89 * 0.0773 (USEPA, 1993)
[5] Assuming the diet is split between invertebrates and plants.
[6] USEPA, 1993
[7] Area of site not covered by parking lots and buildings (1.2 acres) divided by American robin's home range of 2 acres from USEPA 1993
[8] Exposure dose = $C_{soil} * SFF * IR / BW*(BAF_{inv} * F_{inv} + BAF_{plant} * F_{plant} + F_{soil})$

TABLE 7-2

Risk Characterization and Protective Ranges for Vermivorous Songbirds
Normandy Park Apartment Site
Temple Terrace, Florida

Effects Level[1]	Toxicity Reference Value[2], mg/kg- day (TRV)	Lead Concentration [3], mg/kg (C_{soil})	Exposure Dose, mg/kg-day[4]	Hazard Quotient[5]	Protective Range (PRG), Mg/kg[6]
NOAEL	3.85	4,407	155	40	110
LOAEL	11.3	4,407	155	14	320

[1] No observable adverse effects level and Lowest observable adverse effects level for reproductive effects

[2] Pattee, 1984; Edens et al., 1976

[3] 95 % upper confidence limit (UCL) on the mean concentration of lead in all samples

[4] From Table 7.1

[5] Hazard Quotient = Exposure Dose / TRV

[6] $PRG = TRV * BW / (SFF * IR * (BAF_{inv} * F_{inv} + BAF_{plant} * F_{plant} + F_{soil}))$

considered substantially different than those protective of human health. Additional details on the calculation of the remedial goals can be found in the *Responses to Comments for FDEP and USEPA and Calculation of Protective Remedial Goals,* dated November1999.

The ecological risk assessment concluded that birds whose diet consists of soil invertebrates would potentially be at risk of impaired reproduction if no response action were taken at the site. The proposed remedy is mass removal of surface soil with backfill. The proposed remedy will protect ecological receptors who feed on worms, millipedes, and grubs in soil by removing the top 2 feet of soil around the apartment complex and replacing it with clean soil. The proposed remedy will protect birds and other wildlife as long as the backfilled soils contain less than the protective range for lead calculated in the ecological risk assessment. Although areas of soil around the trees will not be excavated, these areas are small enough that they will not affect the overall protectiveness of the remedy.

8.0 REMEDIAL ACTION OBJECTIVES

The remedial action objective for soil contaminants at the Normandy Park Apartments site will be to remove and treat, if necessary, the top two feet of soil throughout the apartment complex and replace with clean fill, thereby eliminating the potential for exposure to surface soil contaminants. The existing concrete caps installed pursuant to the EPA emergency response action, the existing buildings, and the asphalt parking lots will act as caps, preventing exposure to the soil underneath. Institutional controls will be used to ensure the soil underneath these structures is properly treated if the land use changes.

The remedial action objective for groundwater at the Site will be to remove the highly contaminated soil in the southern courtyard, which is acting as a source to groundwater contamination. After removal of this significant source, monitor the groundwater as it naturally attenuates to below the cleanup levels found in table 12-1.

9.0 DESCRIPTION OF ALTERNATIVES

The following remedial alternatives were developed to remediate the soil and groundwater contamination:

Alternative 1: No Action
Alternative 2: On-Site Capping with Institutional Controls
Alternative 3: Excavation, Off-Site Disposal, Monitored Natural Attenuation and Institutional Controls
Alternative 4: Excavation, Off-Site Screening, Ex-Situ Solidification/Stabilization, Off-Site Disposal, Monitored Natural Attenuation and Institutional Controls
Alternative 5: Excavation, On-Site Screening, Ex-Situ Solidification/Stabilization, Off-Site Disposal, Monitored Natural Attenuation and Institutional Controls

9.1 Description of Remedy Components

Alternative 1: No Action
(Estimated total cost: $0)

- The No Action alternative was required to be evaluated as a baseline for comparison of other alternatives. Under these alternatives, no further cleanup activities would occur at the Site. This remedial alternative would not include any measures to remove, treat, or contain soil contaminants or restrict further migration of groundwater contamination off-site or to the Floridan aquifer. If implemented, this alternative would be considered the final remedy and would not involve any periodic reviews to verify its protectiveness.

Alternative 2: On-Site Capping with Institutional Controls
(Estimated total cost: $2,274,226)

- **On-Site Capping:** Alternative 2 was evaluated in order to consider a containment alternative. Areas of partial soil capping are already present at the Site. Under alternative 2, an asphalt, concrete, or clay cap would be placed over the contaminated areas of concern at the Site thereby containing the contaminated soil underneath. Additionally, it is believed that reducing the amount of water passing through the soil, would enhance the containment of the groundwater contamination.

- **Institutional Controls:** Alternative 2 would include institutional controls to limit future use of the soil and groundwater. Periodic reviews (every 5 years) would be required to determine if the remedy remains protective of human health and the environment.

Alternative 3: Excavation, Off-Site Disposal, Monitored Natural Attenuation and Institutional Controls
(Estimated total cost: $ 4,932,600)

- **Excavation:** Under alternative 3, the top 2 feet of exposed surface soil would be removed throughout the complex and replaced with clean soil. A liner would be placed underneath the clean soil to prevent the upward migration of any solid material beneath the clean soil (i.e., plastic battery casings). In addition to removing the top 2 feet in the southern complex, an additional six feet of soil would be removed in a 30 x 30 foot square around monitoring well MW-7 to remove this localized hot spot. The excavated area would be filled with clean soil. Throughout the complex, in areas with large trees, the excavation of two feet of soil would be limited to a radius of 20 feet around each tree to ensure its continued growth. Within this 20 foot radius, steps such as placing a metal grate around each tree, would be taken to prevent direct exposure to soil

- **Off-Site Disposal:** Under this alternative, all excavated soil would be taken off-site and disposed of in a permitted facility as appropriate.

- **Monitored Natural Attenuation:** This alternative would also include long-term groundwater monitoring to ensure contaminants in the groundwater naturally attenuate to levels below the cleanup goals and do not migrate off-site.

- **Institutional Controls:** Institutional controls would be used to limit the use of groundwater and notify of the potential soil and groundwater contamination. Periodic reviews (every 5 years) would be required to determine if the remedy remains protective of human health and the environment

Alternative 4: Excavation, Off-Site Screening, Ex-Situ Solidification/Stabilization, Off-Site Disposal, Monitored Natural Attenuation and Institutional Controls
(Estimated total cost: $3,637,011)

- **Excavation:** Under alternative 4, the top 2 feet of exposed surface soil would be removed throughout the complex and replaced with clean soil. A liner would be placed underneath the clean soil to prevent the upward migration of any solid material beneath the clean soil (i.e., plastic battery casings). In addition to removing the top 2 feet in the southern complex, an additional six feet of soil would be removed in a 30 x 30 foot square around monitoring well MW-7 to remove this localized hot spot. The excavated area would be filled with clean soil. Throughout the complex, in areas with large trees, the excavation of two feet of soil would be limited to a radius of 20 feet around each tree to ensure its continued growth. Within this 20 foot radius, steps such as placing a metal grate around each tree, would be taken to prevent direct exposure to soil

- **Off-Site Screening:** Excavated soil from the northern and southern complexes would be taken to an off-site staging area, sampled, and would either be used as clean fill, be treated and used as fill in the excavated area in the southern courtyard, or be treated and sent off-site for disposal.

- **Ex-Situ Solidification/Stabilization, Off-Site Disposal**: The soil which, based on the screening results, would need to be treated prior to disposal would be solidified and/or stabilized off-site to reduce the mobility of the contaminants. Solidification/stabilization is an appropriate method for treating all contaminants of concern in the soil. The treated soil would then be sent to an appropriate off-site facility for disposal.

- **Monitored Natural Attenuation:** This alternative would also include long-term groundwater monitoring to ensure contaminants in the groundwater naturally attenuate to levels below the cleanup goals and do not migrate off-site.

- **Institutional Controls:** Institutional controls would be used to limit the use of groundwater and notify of the potential soil and groundwater contamination. Periodic reviews (every 5 years) would be required to determine if the remedy remains protective of human health and the environment

Alternative 5: Excavation, On-Site Screening, Ex-Situ Solidification/Stabilization, Off-Site Disposal, Monitored Natural Attenuation and Institutional Controls
(Estimated total cost: $3,425,913 w/solidification & $3,138,218 w/o solidification)

- **Excavation:** Similar to alternatives 3 and 4, alternative 5 would involve excavation of the top 2 feet of exposed surface soil throughout the complex which would be replaced with clean soil. A liner would be placed underneath the clean soil to prevent the upward migration of any solid material beneath the clean soil (i.e., plastic battery casings). Throughout the complex, in areas with large trees, the excavation of two feet of soil would be limited to a radius of 20 feet around each tree to ensure its continued growth. Within this 20 foot radius steps, such as placing a metal grate around each tree, would be taken to prevent direct exposure to soil. In the southern complex, wooden deck would be removed and 7 - 8 feet of soil would be excavated where technically feasible without affecting the structural integrity of the existing buildings or swimming pool. The excavated area would be replaced with clean fill.

- **On-Site Screening:** Excavated soil from northern and southern complexes would be taken to the staging area in the open field behind the apartments, sampled, treated appropriately, and sent off-site for disposal.

- **Ex-Situ Solidification/Stabilization, Off-Site Disposal:** The soil which, based on the on-site screening, would need to be treated prior to disposal would be solidified and/or stabilized to reduce the mobility of the contaminants and sent to an appropriate off-site facility for disposal.

- **Monitored Natural Attenuation:** Natural attenuation of the contaminants in the groundwater would be expected after a considerable amount of the source is removed as described in this remedy. Groundwater monitoring would be used to ensure that contaminants in the groundwater naturally attenuate to levels below the cleanup standards and do not migrate off-site.

- **Institutional Controls:** Institutional controls would be used to limit the use of groundwater and to notify of the potential soil and groundwater contamination. Periodic reviews (every 5 years) would be required to determine if the remedy remains protective of human health and the environment.

9.2 Common Elements and Distinguishing Features of Each Alternative

Alternative 1 - No Action: Under the No Action alternative, no future action would be taken at the Site. Therefore, it has no common elements and will not be discussed further in this section.

Key ARARs Associated With Each Alternative:

The following ARARs either chemical or location specific and would be associated with all the alternatives evaluated:

1 . Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141);
2. Clean Water Act Discharge Limitations NPDES Permit (40 CFR Parts 122, 129, & 136) (Pretreatment Standards 40 CFR 403.5 & 455.20);
3. Clean Air Act National Ambient Air Quality Standards (40 CFR Part 50);
4. Clean Air Act New Source Performance Standards (NSPS) (40 CFR Part 60);
5. Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAPS) (40 CFR Part 61);
6. Occupational Safety and Health Standards (29 CFR Parts 1910.120 and 1926); and
7. Florida Rules on Permits Title 62 Chapter 62-2;
8. Florida Water Quality Standards Title 62 Chapter 62-3;
9. Florida Air Pollution Rules Title 62 Chapter 62-4;
10. Florida Surface Water Quality Standards Title 62 Chapter 62-301 & 62-302;
11. Florida Drinking Water Quality Standards Title 62 Chapter 550;
12. Florida Stormwater Discharge Regulations Title 62 Chapters 62-301 & 62-302; and
13. Florida Rules on Hazardous Waste Warning Signs Title 62 Chapter 62-730.

Alternative 2, the containment alternative evaluated, would trigger a minimum number of ARARs since it would involve no excavation, transportation, treatment, or disposal of contaminated soil. In addition to the Key ARARs associated with each alternative listed above, alternative 2 would trigger the following ARARs:

1. Resource, Conservation, and Recovery Act (RCRA) Groundwater Monitoring Requirements (40 CFR Part 264 Subpart F);
2. Resource, Conservation, and Recovery Act (RCRA) Closure and Post-Closure Requirements (40 CFR Part 264 Subpart G);
3. Resource, Conservation, and Recovery Act (RCRA) Landfill Requirements (40 CFR Part 264 Subpart M);

Alternatives 3, 4, and 5 all involve excavation, treatment, transport, and disposal of contaminated soil. In addition to the Key ARARs associated with each alternative listed above, alternatives 3,4, and 5 would trigger the following ARARs:

1. Resource, Conservation, and Recovery Act (RCRA) Identification of Hazardous Wastes (40 CFR Part 261);
2. Resource, Conservation, and Recovery Act (RCRA) Facility Standards,
3. Resource, Conservation, and Recovery Act (RCRA) Manifest System, Recordkeeping, and Reporting (40 CFR Part 264 Subpart E);
4. Resource, Conservation, and Recovery Act (RCRA) Storage Requirements (40 CFR Part 264 Subparts I, J, and L);
5. Resource, Conservation, and Recovery Act (RCRA) Landfill Requirements (40 CFR Part 264 Subpart M);
6. Resource, Conservation, and Recovery Act (RCRA) Treatment Requirements (40 CFR Part 264 Subparts O and X);
7. Resource, Conservation, and Recovery Act (RCRA) Land Disposal Restrictions (40 CFR Part 268);
8. Department of Transportation Rules for the Transport of Hazardous Substances (49 CFR Parts 107 & 171-179);
9. Florida Resource, Recovery and Management Regulations Title 62 Chapter 62-7;
10. Florida Hazardous Waste Rules Title 62 Chapter 62-730; and
11. Florida Hazardous Substances Release Notifications Rule Title 62 Chapter 62-150.

Long Term Reliability of Remedy:

Alternatives 3, 4 and 5 would be the most reliable in reducing the potential for exposure to site contaminants in the long-term. These alternatives result in the removal of the top 2 feet of soil therefore, eliminating the potential for long-term exposure to contaminants in the surface soil. Under alternative 2, the contaminated soil would remain in place and therefore, the long-term potential for exposure would not be permanently removed. Alternative 5 would be the most reliable for long-term remediation of the groundwater because under alternative 5, a larger amount of contaminated soil would be removed from the southern courtyard thereby reducing a more significant amount of material that is acting as a source to groundwater contamination.

Quantity of Untreated Waste to be Disposed Off-site or Managed On-Site:

Alternative 5 would treat the largest amount of contaminated soil. Under alternatives 3, 4, & 5, the top two feet of soil would be excavated throughout the complex. However, alternatives

3 & 4 would only excavate to the water table (7-8 feet) a 30 x 30 foot area in the southern complex. Under alternative 5, to the extent practicable, all soil that could be feasiblely removed in the southern complex would be excavated to the water table and then treated. Alternative 2 would not treat any contaminated soil.

Uses of Presumptive Remedies and/or Innovative Technologies:

Solidification/stabilization was evaluated as the treatment method for the contaminated soil due to its proven effectiveness at treating soil contaminated with metals. Even though no innovative technologies were evaluated, the method for conducting the remedial investigation and feasibility study was innovative in the sense that EPA encouraged the potentially responsible party (PRP) to streamline the investigation and focus on a minimum number of remedial alternatives. EPA also used its enforcement discretion to delay listing of the Site on the NPL in exchange for the cooperation of the PRP. This shows EPA's willingness to work with cooperative PRP's to reduce the costs of site investigations in exchange for expediting the process while still developing an NPL equivalent remedy.

9.3 Expected Outcomes of Each Alternative

Alternative 1: The no action alternative does not include implementation of any active remedial measures. If no further actions were taken at the site, the contaminated soil beneath the southern complex would continue to act as source to groundwater contamination. Additionally, the wooden deck, which was installed as a temporary measure to prevent exposure, could eventually deteriorate, allowing exposure to the contaminated soil beneath and exposure to contaminants in the surface soil throughout the complex would continue.

Alternative 2: Alternative S2 would be designed only to effectively contain the contamination by the installation of a cap across the complex. It would effectively prevent exposure to contaminated surface soil. However, even though it would limit the amount of rainwater which would flow through the soil, it is considered less likely that Alternative 2 will result in groundwater contaminant concentrations naturally attenuating to levels below the cleanup standards as effectively as Alternatives 3, 4, and 5. Additionally, installing a cap across the complex would significantly impact the residents by permanently reducing the quality of life at the apartment complex.

Alternatives 3, 4, & 5: These alternatives would all result in the same outcome with respect to potential exposure to surface soil. All three of these alternatives would remove the potential for direct contact with surface soil by excavation, treatment, and disposal of the surface soil and replacing it with clean fill. With respect to achieving the groundwater cleanup goals, it is expected that alternative 5 would be most effective. In alternatives 3 & 4 only a 30 x 30 foot area would be excavated to the water table in the southern courtyard. By excavating a significantly larger amount of this highly contaminated sub-surface soil that is likely contributing to groundwater contamination, it is expected that alternative 5 would reach the groundwater cleanup goals in a shorter time-frame than alternatives 3 or 4.

10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Overall protection of human health and the environment would be achieved under alternatives 2, 3, 4, and 5, since the potential for direct human exposure to contaminated surface soil would be eliminated. Alternatives 3, 4, and 5, would be most protective because the upper 2 feet of soil would be excavated, treated (if necessary), and taken off-site for disposal. Alternative 1 would not be protective of human health and the environment. If no action is taken at the Site, temporary measures such as the wooden deck could eventually degrade and not prevent exposure to the contaminated soil underneath. Additionally, long-term exposure to contaminated surface soil could potentially cause adverse health effects. Because the No Action alternative is not protective of human health and the environment, it was eliminated from consideration under the remaining eight criteria.

Compliance With ARARs

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs" unless such ARARs are waived under CERCLA section 121(d)(4). The ARARs associated the evaluated alternatives are listed on page 9-4.

Alternatives 2, 3, 4, and 5 would be designed to comply with all ARARs. Natural attenuation and source control will be used to comply with groundwater ARARs. Currently, sample results show exceedances of the drinking water standard for lead and antimony. However, these contaminants have not been shown to be migrating off-site and occur in the areas with the most highly contaminated soil. It is anticipated that the soil remediation activities will have a positive impact on the groundwater contaminant concentrations. Under these alternatives, long-term groundwater monitoring will occur to ensure contaminants do not migrate off-site and that on-site groundwater concentrations decrease to the cleanup goals as a result of the soil remediation activities. Institutional controls will be used to prevent any on-site exposure to contamination above drinking water standards until all ARARs are met.

Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk and the adequacy and reliability of controls.

Alternatives 3, 4 and 5 would be the most effective in the long-term. These alternatives would result in the removal of the top 2 feet of soil therefore, eliminating the potential for long-term exposure to contaminants in the surface soil. Under alternative 2, the contaminated soil would remain in place and therefore, the long-term potential for exposure would not be permanently removed.

Reduction of Toxicity, Mobility, or Volume

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternatives 3, 4, and 5 would be the most effective in reducing the mobility of the contaminants through proper treatment via solidification/stabilization of contaminated soil prior to disposal. Alternative 2, however not as effectively, also reduces the mobility of contaminants by placing a cap across the entire complex. None of the alternatives evaluated result in reduction of the toxicity or volume of contaminants.

Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers and the community during construction and operation of the remedy until cleanup goals are met.

Alternative 2 would result in a slightly increased risk of inhalation and ingestion of soil contaminants due to grading activities and cap construction and would complete its objective in less than one year. Alternatives 3, 4, and 5 would result in increased risk of inhalation and ingestion of soil contaminants due to the excavation , soil staging, solidification, and backfilling. This risk however, would be minimized through control of fugitive dust and access to downwind areas. Although the construction timeframe will be relatively short, the estimated time for these alternatives to reach the remedial action objectives for soils is 1.5 years so that the sufficient designs are developed for implementation of the cleanup option.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 2 would be the next easiest to implement in that it only involves the construction of an asphalt, concrete, or clay cap over the existing soil. Alternative 3 would be the easiest of the remaining alternatives to implement, since excavated soil would be taken directly off-site for disposal. Additionally, a pilot study would not be required. Alternatives 4 and 5 would be the most difficult to implement. Both alternatives would require pilot studies and additional handling of soil. Under alternative 4, the soil would be taken off-site, staged, and either brought back to the Site to be used as backfill or taken to a permitted facility for disposal. This would involve testing of the soil and additional handling of the soil. This is made somewhat easier under alternative 5 since the excavated soil would be staged, tested, and treated on-site

Cost

The estimated present worth costs for the alternatives range from $ 2,274,226 for alternative 2 to $ 4,932,600 for alternative 3. The costs for alternatives 3 & 4 are highest because they require contaminated soil to be transported off-site prior to treatment and because they result in the most amount of soil being disposed off-site. Cost summaries can be found below in Table 10-1.

Table 10-1 - Cost Comparison for Remedial Alternatives (Amounts in Dollars)

	Alternative 2	Alternative 3	Alternative 4	Alternative 5 (w/ solidification)	Alternative 5 (w/o solidification)
Capital Cost	1,995,017	4,378,406	3,192,170	2,982,219	2,724,285
Indirect Cost	230,194	505,201	395,827	371,602	341,841
Annual O & M Cost	5,592	5,592	5,592	72,092	72,092
Present Worth Total Cost	**2,274,226**	**4,932,600**	**3,637,011**	**3,425,913**	**3,138,218**

Alternative 2: On-Site Capping with Institutional Controls

Alternative 3: Excavation, Off-site Disposal, Monitored Natural Attenuation and Institutional Controls

Alternative 4: Excavation, Off-site Screening, Ex-Situ Solidification/Stabilization, Off-site Disposal, Monitored Natural Attenuation and Institutional Controls

Alternative 5: Excavation, On-site Screening, Ex,-Situ Solidification/Stabilization, Off-site Disposal, Monitored Natural Attenuation and Institutional Controls

State Acceptance

The State of Florida has provided input during the Streamlined Remedial Investigation and Focused Feasibility Study process and supports the selected remedy.

Community Acceptance

Based on the responses received during the public comment period, the community also supports the selected remedy. The public comments and EPA responses are contained in the Responsiveness Summary, found in appendix B.

11.0 PRINCIPAL THREAT WASTES

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The manner in which principal threat wastes are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied.

At this Site, there are no liquid source materials such as drums or tanks, the contaminants are heavy metals and are not very mobile, and the concentrations of lead have not been found at levels that would pose acute health threats. However, the treatment of the contaminated soil is a principal element of the selected remedy and therefore, satisfies the NCP's preference for treatment.

12.0 SELECTED REMEDY

12.1 Summary of the Rationale for the Selected Remedy

Based on consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and public and State comments, EPA has selected a remedy to address the contaminated soil and groundwater at this Site. The purpose of this response action is to control risks posed by potential future exposure to soil contaminated with lead and groundwater contaminated with lead and antimony and to minimize the potential for future migration of contaminants into the Floridan aquifer. The baseline risk assessment results indicate that lead concentrations in the on-site surface soil pose an unacceptable risk to human health. Comparison of the groundwater data to the drinking water standards indicate that lead and antimony are present in the surficial aquifer at levels that would pose and unacceptable risk if the surficial aquifer were to be used as a drinking water source. At the conclusion of this remedy, the soil and surficial groundwater will be remediated to levels that no longer pose an unacceptable risk to human health and the environment. To ensure the remedy continues to be protective of human health and the environment, a review of the remedy will be conducted every five years.

The selected remedy is believed to be the most effective remedial strategy taking into consideration effectiveness versus cost and attempting to minimize the impact on the residents. A discussion of the cost effectiveness of the selected remedy is given in section 13.3.

12.2 Description of the Selected Remedy

EPA has selected alternative 5, *Excavation, On-Site Screening, Ex-Situ Stabilization, Off-Site Disposal, Monitored Natural Attenuation, and Institutional Controls*, as the alternative for remediating the Normandy Park Apartments Site.

The preferred alternative would involve the following activities:

1) **Excavation:**

All exposed soil will be excavated throughout the complex to 2 feet with the exception of a 20 foot radius around existing tress. A permeable liner will be placed in the excavated area to prevent the upward migration of any solid materials such as plastic battery casings. The existing structures such as buildings and parking lots serve as caps and prevent potential exposure to the contaminated soil beneath them. Therefore, the soil beneath the existing structures will not be disturbed. In the southern complex, the deck will be removed and the soil will be excavated to the water table (7-8 feet), where technically feasible without endangering the existing buildings and swimming pool. All excavated areas will be filled with clean soil and sodded.

2) **On-Site Screening:**

All excavated soil will be taken to a staging area behind the apartments, sampled and treated appropriately. Treated soil will be sent off-site for disposal. The screening results will be compared to the Landfill Disposal Regulations under the Resource Conservation and Recovery Act (RCRA) to determine whether soil treatment is necessary.

3) **Ex-Situ Stabilization, Off-Site Disposal:**

If the screening results indicate the soil must be treated prior to disposal, then the soil will be treated via ex-situ stabilization to reduce the mobility of the contaminants. Treated soil will be tested using the Toxic Characteristic Leaching Procedure (TCLP) to ensure it has been properly stabilized to prevent further leaching of contaminants to groundwater. Treated soils will be sent to an off site facility for disposal

4) **Monitored Natural Attenuation:**

As part of the remedial design, a groundwater monitoring compliance program will be developed to monitor the progress of the groundwater restoration. This will include determining the location for additional groundwater monitoring wells to complete the monitoring network. At a minimum, a well cluster consisting of a deep surficial well screened just above the clay layer and a shallow monitoring well will be located in the southeastern corner of the complex. The installation of additional monitoring wells may also be necessary to complete the monitoring network. This monitoring network will be used to monitor the progress of natural attenuation.

Monitoring of the groundwater will continue until the cleanup levels are reached. Post remediation monitoring will be conducted for a minimum of one year to confirm that the performance standards have been reached. If it is determined that natural attenuation is not occurring, the effectiveness of the remedy may be reevaluated and additional measures may be taken in order to remediate the groundwater.

5) **Institutional Controls:**

Existing structures at the apartment complex such as buildings and parking lots currently prevent potential exposure to the soil underneath. As part of this remedy, institutional controls will be used to ensure the existing structures remain protective and to limit the use of groundwater prior to the groundwater cleanup levels being reached. An easement will be obtained from the property owner which will require the current property owner to obtain EPA and FDEP approval prior to removing or modifying the existing structures in a way that would inhibit their ability to prevent exposure to the soil underneath. The following steps will be taken to prevent potential exposure to contaminated groundwater. First, requirements will be placed in the Consent Decree which limit the use of groundwater. Secondly, a notice will be placed on the property deed to inform of the contaminated groundwater and the limitations for its use until cleanup levels are reached.

12.3 Summary of the Estimated Remedy Costs

The summary of the estimated costs of the selected remedy can be found in table 10-1. The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or a ROD amendment, This is an engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

12.4 Expected Outcome of Selected Remedy

It is expected that on completion of this remedy, the exposed surface soil and groundwater will be remediated to levels that do not pose an unacceptable risk to human health or the environment. These cleanup levels, which are shown in table 12-1, are based on the risk assessment conducted for the Site and on enforceable state and federal drinking water standards. Since not all contaminated soil is being treated, future land use will be limited. Existing buildings, parking lots, and previously installed concrete caps are currently serving to prevent direct exposure to the soil underneath. Measures must be in place that ensure these structures are maintained to continue to act as caps. Institutional controls will be used to ensure that if in the future these structures are removed or disturbed, that the appropriate measures are taken to address the soil underneath. Once the cleanup goals for groundwater are met (lead - 0.015 mg/l and antimony - 0.006 mg/l), then future use of groundwater will not be limited by Site contaminants. Since natural attenuation is likely to take many years, it is not expected that the cleanup goals for groundwater will be met in a short time frame.

Residents have indicated they would prefer that the wooden deck not be removed. However, the deck must be remove to excavate the soil underneath. EPA believes that addressing soil contamination in the way proposed, with new sod being installed, will result in a permanent remedy which is protective of human health and the environment as well as being an aesthetic improvement to the apartment complex.

TABLE 12-1
NORMANDY PARK APARTMENTS CLEANUP LEVELS

Contaminant	Groundwater (mg/l)	Soil (mg/kg)
Antimony	0.006	none
Lead	0.015	420

13.0 STATUTORY DETERMINATIONS

13.1 Protection of Human Health and the Environment

The selected remedy will be protective of human health and the environment by excavating the contaminated surface soil and replacing it with clean fill. The excavated soil will be tested and treated via stabilization, if necessary, and sent off-site for disposal. Monitored natural attenuation will be used to ensure that the contaminant levels decrease to below the cleanup standards after the removal of a significant source in the southern courtyard. Finally, institutional controls will be used to limit future use of the soil and groundwater and to inform potential future owners of the contaminants present.

13.2 Compliance with ARARs

The selected remedy will comply with all Federal and State requirements that are Applicable or Relevant and Appropriate (ARARs). The ARARs associated with the selected remedy are:

- Clean Air Act (CAA) (40 CFR 50, 60, and 61) and Florida Air Pollution Rules (Title 62 Chapters 62-2 and 62-4). Hillsborough County is currently a non-attainment area for ozone and total suspended particulates). These requirements establish emission standards emission rates, baseline areas, and source classifications for protection of public health and public welfare. Additionally, they identify new source requirements, test and analysis methods, and procedures for permitting requirements of EPA and FDEP.

- Clean Water Act (40 CFR 122, 129, 136, 403.5 and 455.20) and Florida Surface Water Quality Standards (Title 62 Chapters 62-301 & 62-302). These requirements establish standards and limitations for discharges to waters of Florida and POTW's from any point source, establish water quality standards for all waters of the State of Florida, and establish design and performance standards and permit requirements for stormwater discharge facilities.

- Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141) and Florida Water Quality Standards Title 62 Chapter 62-3 and MCLs (FAC 62-550). The SDWA and Florida law provides groundwater MCLs that have been determined to be acceptable for the consumption of drinking water. If different, the more stringent MCL was selected. The MCLs are applicable and are the basis for determination of the cleanup standards for groundwater.

- Resource, Conservation, and Recovery Act (RCRA) Hazardous Waste Regulations (40 CFR 261, 264, and 268) and Florida Hazardous Waste Regulations (FAC 62-7, 62-150, and 62-730). These regulations provide requirements for identifying, handling and disposal of hazardous wastes. These regulations are applicable and will apply to the excavation and

disposal of soil portion of the remedy.

- Department of Transportation (DOT) regulations for transport of hazardous waste (49 CFR 107 and 171-179). This regulation provides requirements for the transport of hazardous waste and will be applicable to the off-site transport of excavated soil.

- Occupational Safety and Health Standards (29 CFR 1910.120 and 1926). These regulations set limits on exposure to workers on a hazardous waste site and set forth minimum health and safety requirements such as personal protection, training, and reporting requirements.

13.3 Cost Effectiveness

In EPA's judgement, the selected remedy is cost effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: *"A remedy shall be cost effective if its costs are proportional to its overall effectiveness."* (40 CFR 300.430(f)(1)(ii)(D). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then comparted to costs to determine cost effectiveness. The relationship of overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence represent a reasonable value for the money to be spent.

The estimated present worth cost of the selected remedy is $ 3,138,218. If alternative 5 also used solidification, the present worth cost would be $ 3,425,913. Alternatives 3 and 4 are more expensive and would result in less soil being excavated and treated. EPA believes that alternative 5 with stabilization, will provide an overall level of protection of human health and the environment comparable to alternative 5 with solidification and alternatives 3 and 4 at a lower cost.

13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal and considering State and community acceptance.

13.5 Preference for Treatment as a Principal Element

By using the treatment method of stabilization for contaminated soil as a significant portion of the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

13.6 Five-Year Review Requirements

Section 121(c) of CERCLA and the NCP provide the statutory and legal bases for conducting five year reviews. If there are any hazardous substances, pollutants, or contaminants remaining at the Site above levels that would allow for unlimited use and unrestricted exposure, EPA shall conduct a review of such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy remains protective of human health and the environment.

14.0 DOCUMENT OF SIGNIFICANT CHANGES

The proposed plan was released for public comment in February 2000. It identified the following alternative as the preferred alternative:

- excavation of the top two feet of exposed soil around the entire apartment complex which would be replaced with clean fill and sodded;
- removal of the wooden deck in the southern complex and excavation of 7-8 feet of soil beneath the deck;
- on-site screening of excavated soil in the open field behind the apartments;
- treatment of the soil via stabilization based on the results of on-site screening;
- placement of treated soil in the excavated area in the southern complex;
- monitored natural attenuation of the groundwater contaminants;
- placement of institutional controls in the form of deed notices to limit future use of soil and groundwater.

During the public comment period, further investigation of the requirements necessary to place stabilized soil in the excavated area of the southern complex, made this portion of the alternative not cost effective. Therefore, EPA altered this part of the remedy to include the placement of clean fill in the excavated area of the southern complex, instead of the treated soil. The treated soil that would have been placed in the excavated area of the southern complex will be taken off site for disposal.

APPENDIX A

Soil Sampling

Locations & Results

FIGURES

Soil Sampling Locations

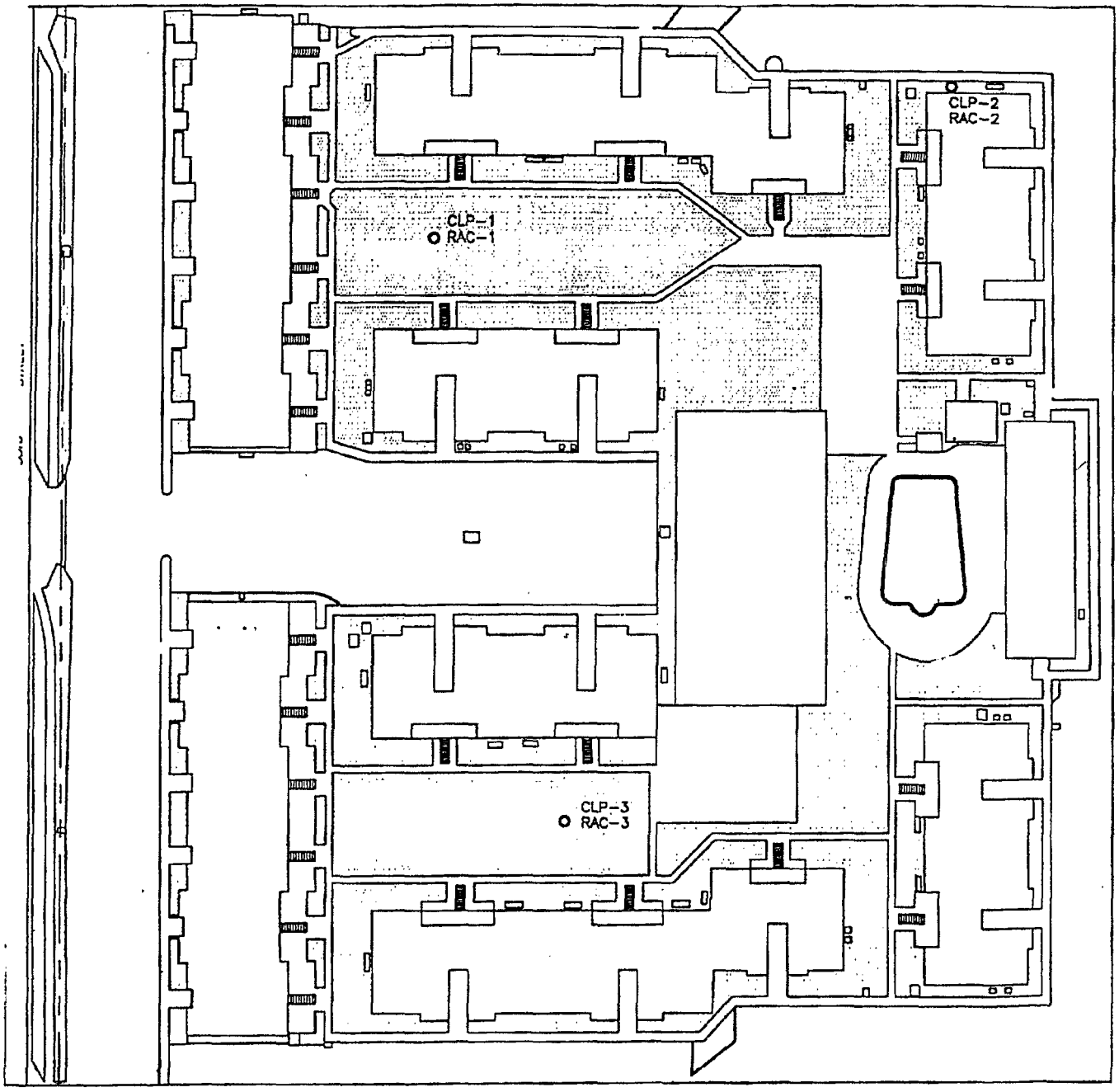


Figure A-1 (North)

CLP Sample Locations
(North Complex)

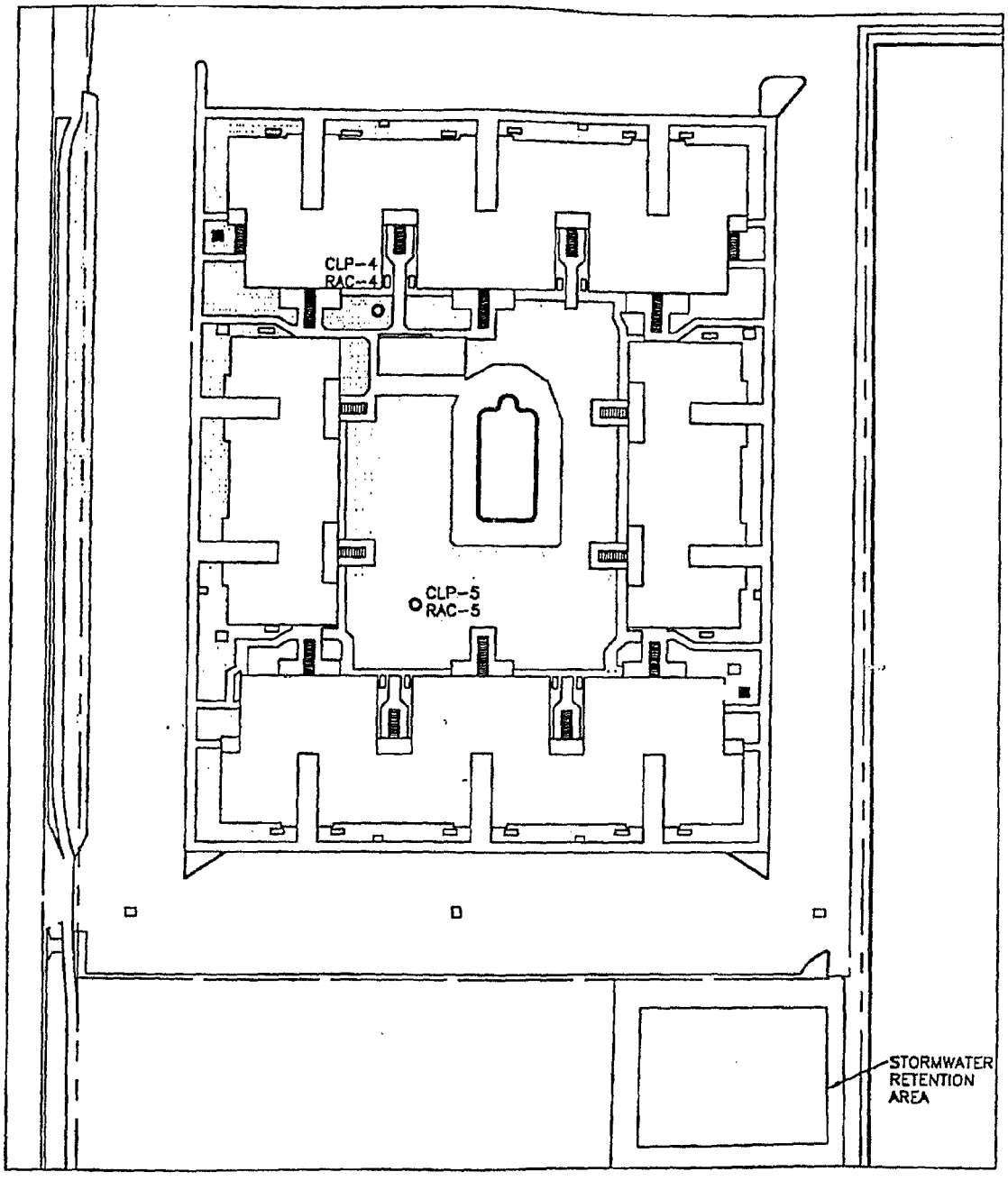


Figure A-1 (South)

CLP Sample Locations
(South Complex)

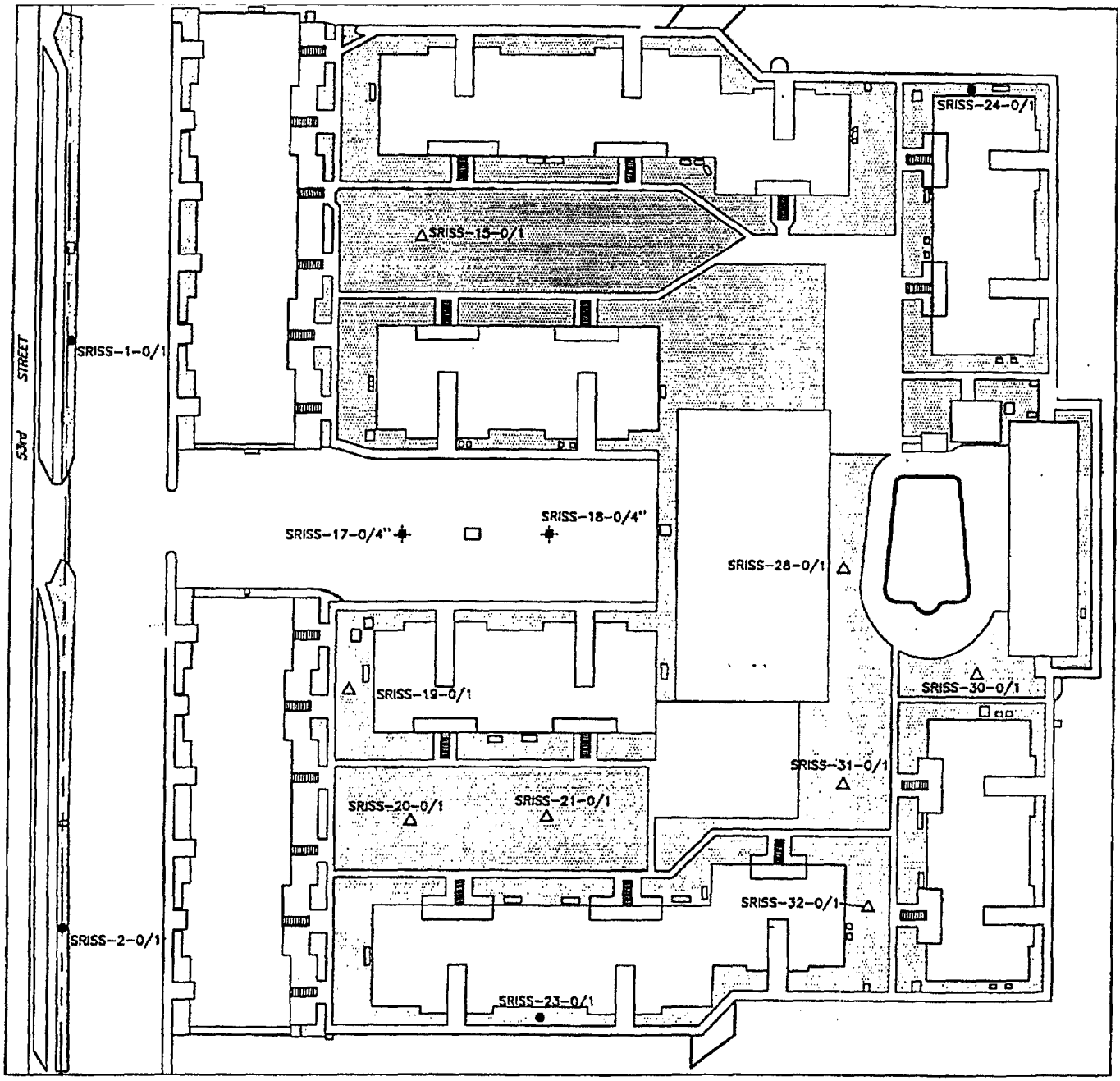


Figure A-2 (North)

Surface Soil Samplé Locations
(0-1 Foot)
(North Complex)

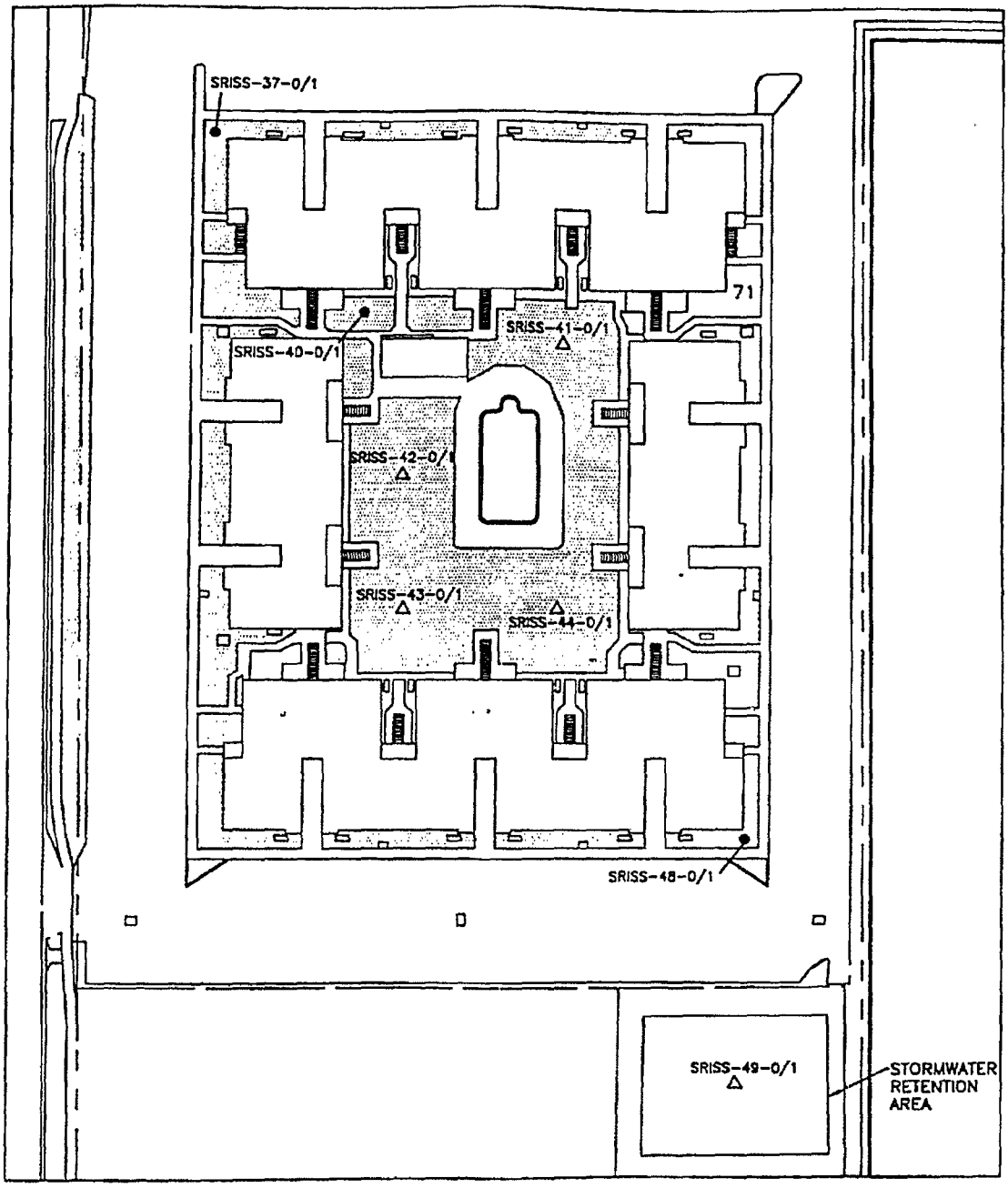
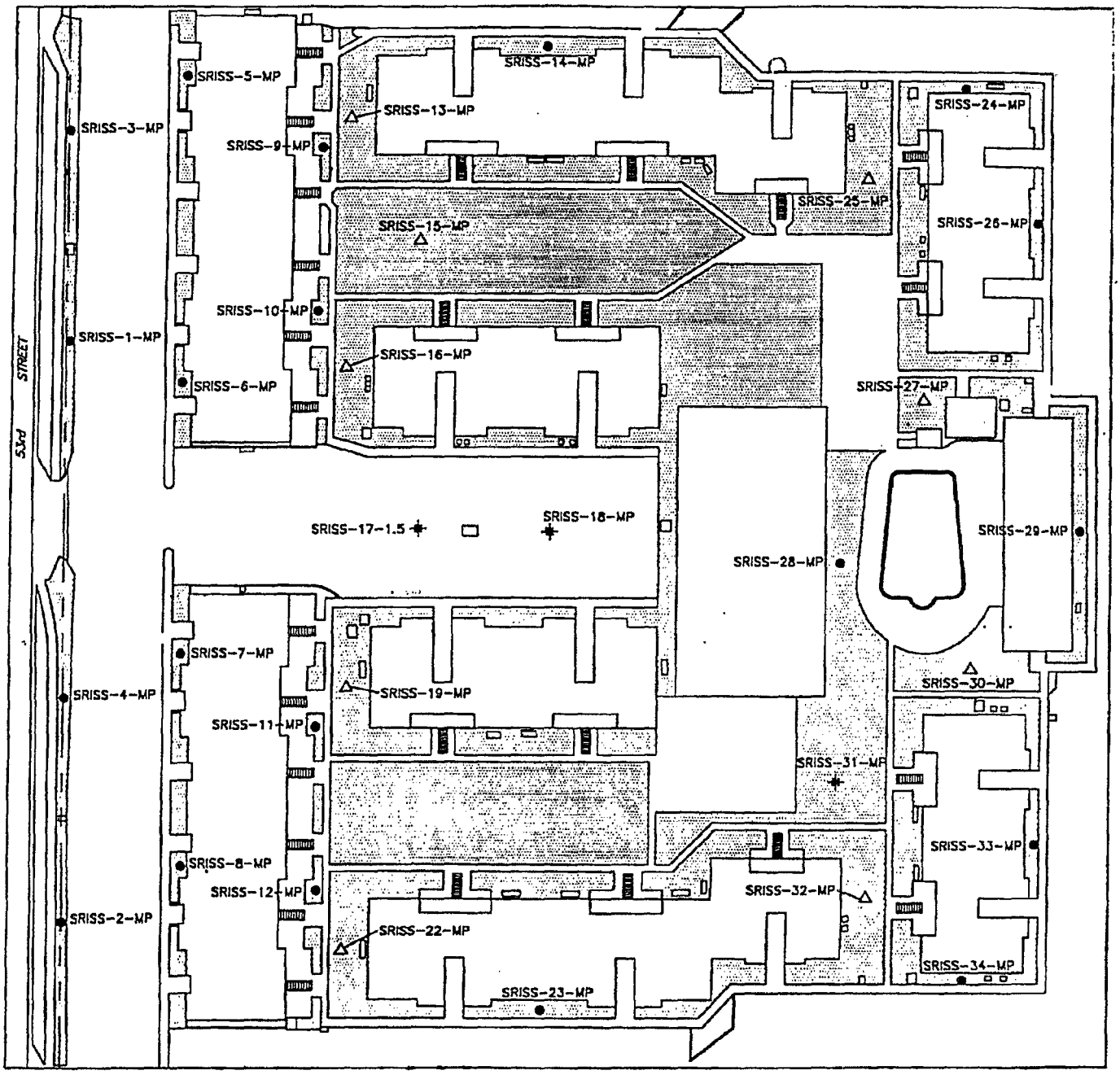


Figure A-2 (South)

Surface Soil Sample Locations
(0-1 Foot)
(South Complex)



NORTH COMPLEX

Figure A-3 (North)

Mid-Point Soil Sample Locations
(North Complex)

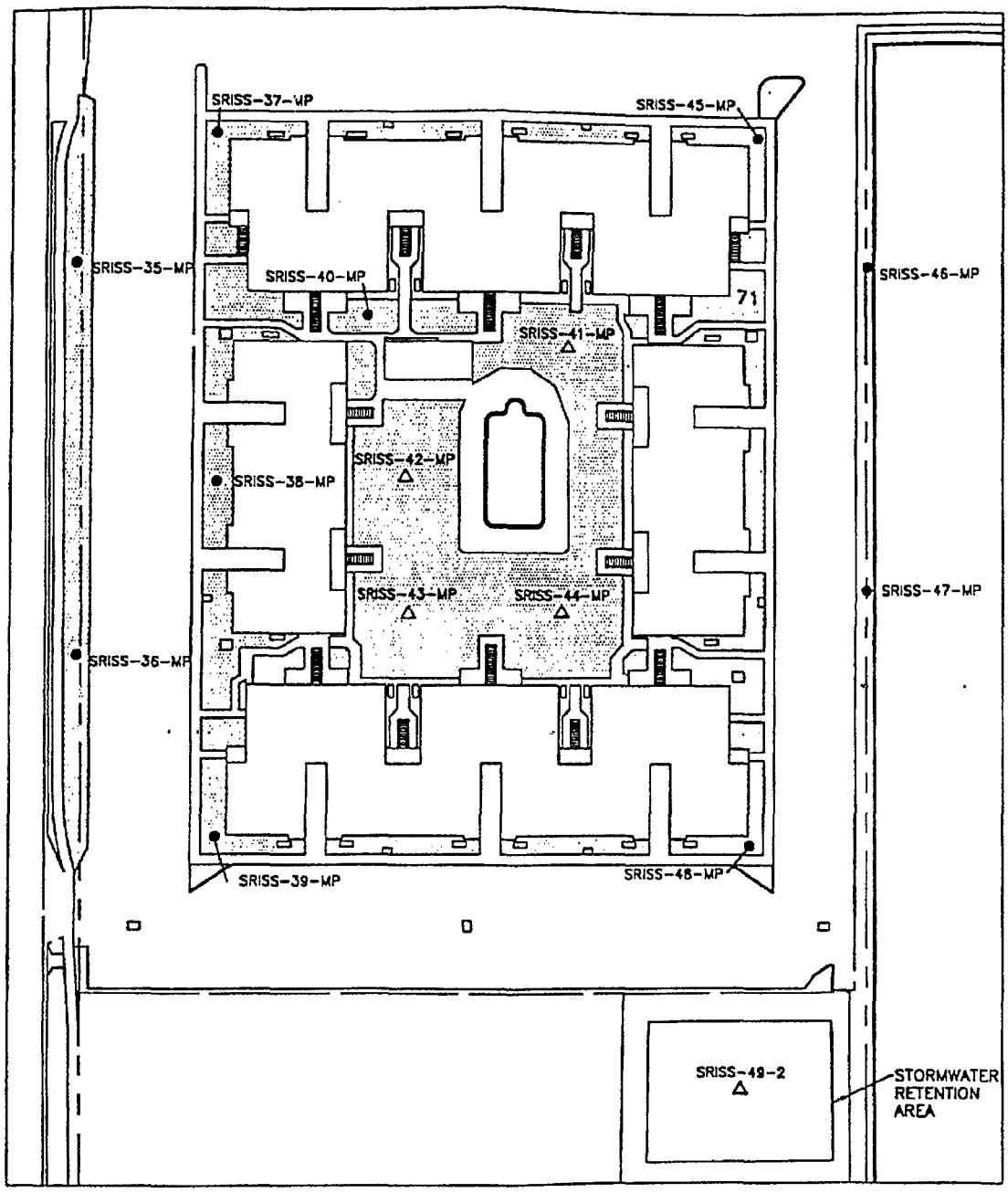
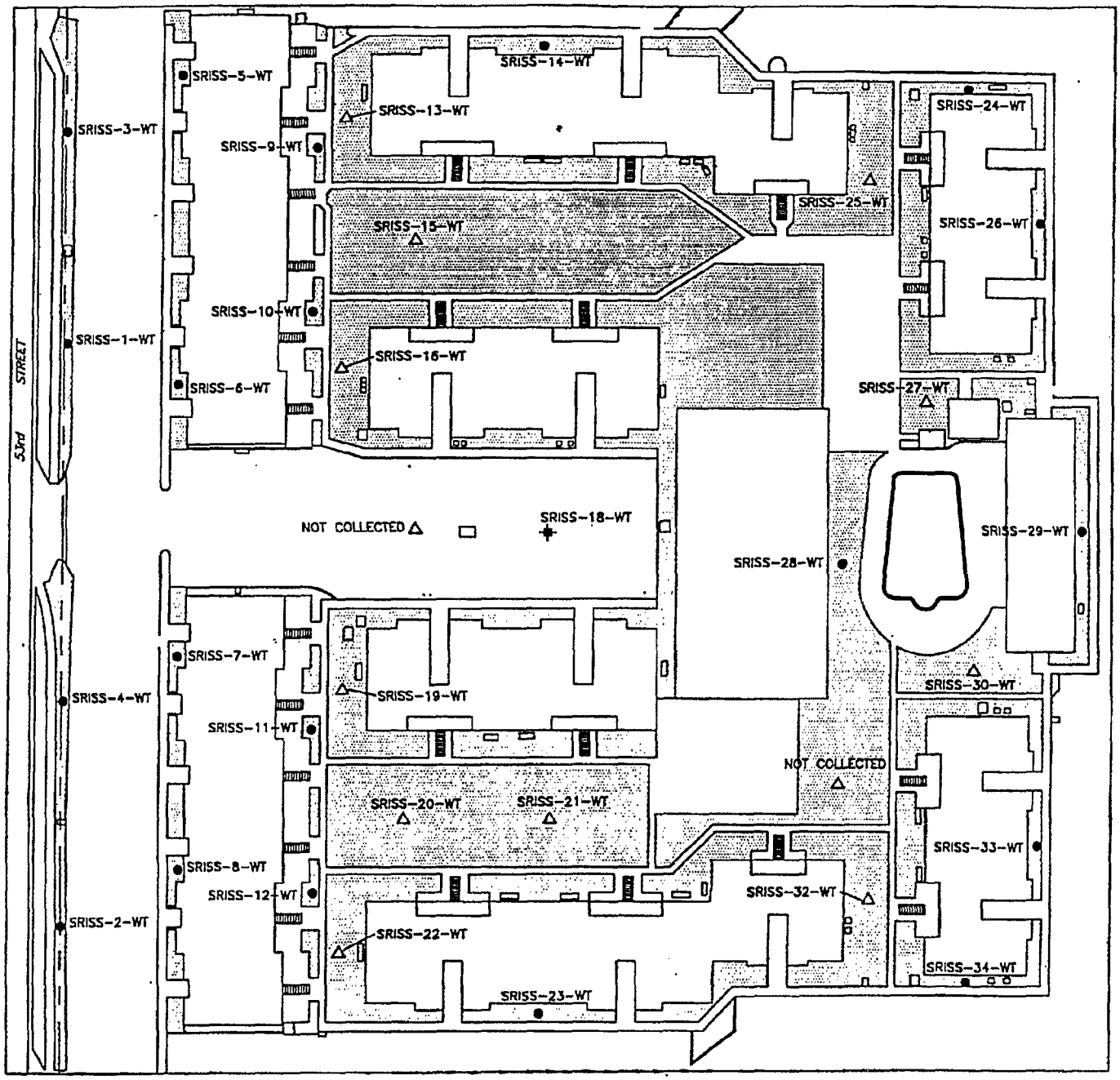


Figure A-3 (South)

Mid-Point Soil Sample Locations
(South Complex)



NORTH COMPLEX

Figure A-4 (North)

Water Table Soil Sample Locations
(North Complex)

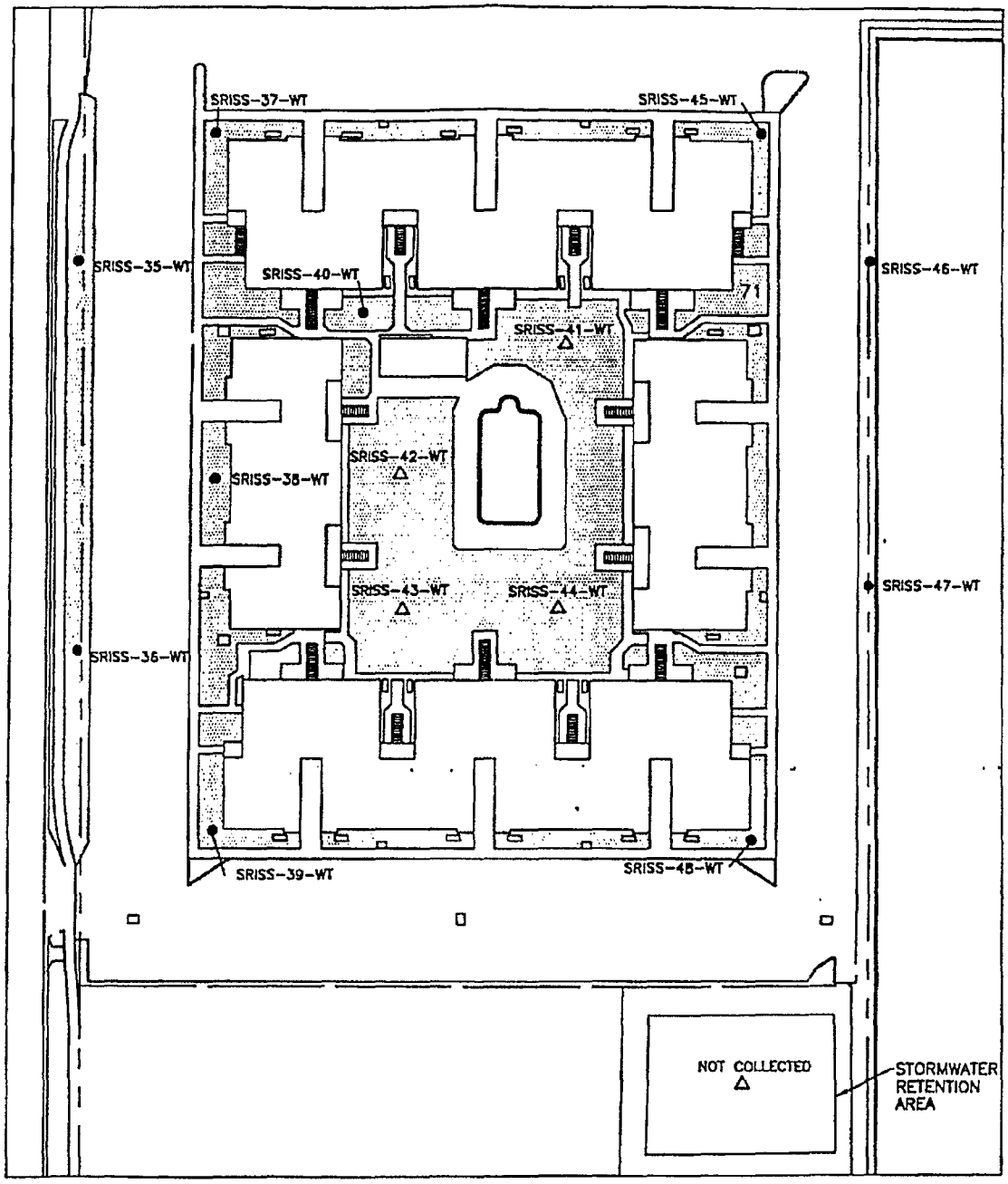


Figure A-4 (South)

Water Table Soil Sample Locations
(South Complex)

TABLES

Soil Sampling
Results

Table A-1

SOIL ANALYTICAL RESULTS
DETECTED PARAMETERS
CONTRACT LABORATORY PROGRAM TARGET ANALYTE LIST
NOVEMBER 11, 1998
NORMANDY PARK APARTMENTS
for
GULF COAST RECYCLING

Sample Designation	Metal (milligrams/kilogram)				SPLP Lead (milligrams/liter)	Compound (milligrams/kilogram)
	Antimony	Arsenic	Cadmium	Lead		Toxaphene
CLP-1	<5.0	<0.60	<0.50	200	0.14	<0.170
CLP-2	<5.0	<0.60	<0.50	96	0.057	<0.180
CLP-3	6.1	<0.60	<0.50	380	0.33	<0.350
CLP-4	24	12	<0.50	1100	0.87	1.40
CLP-5	210	41	0.58	13000	3.3	0.250

TABLE A-2

SOIL SAMPLE ANALYTICAL RESULTS
DECEMBER 14-18, 21, AND 22, 1998
NORMANDY PARK APARTMENTS
for
GULF COAST RECYCLING

Sample Designation	Sample Date	Metal Concentration (milligrams per kilogram)			
		Antimony	Arsenic	Cadmium	Lead
SRISS-1-0/1	12/16/1998	<5.0	0.82	NA	200
SRISS-1-MP	12/16/1998	<5.0	<0.60	NA	12
SRISS-1-WT	12/16/1998	<5.0	<0.60	NA	<5.0
SRISS-2-0/1	12/15/1998	6.9	1.3	NA	400
SRISS-2-MP	12/15/1998	<5.0	0.79	NA	140
SRISS-2-WT	12/15/1998	<5.0	<0.60	NA	8.5
SRISS-3-MP	12/16/1998	<5.0	<0.45	NA	5.4
SRISS-3-WT	12/16/1998	<5.0	<0.45	NA	<5.0
SRISS-4-MP	12/15/1998	<5.0	1.5	NA	140
SRISS-4-WT	12/15/1998	<5.0	<0.45	NA	13
SRISS-5-MP	12/22/1998	<5.0	<0.45	NA	6.4
SRISS-5-WT	12/22/1998	<5.0	<0.45	NA	<5.0
SRISS-6-MP	12/22/1998	<5.0	1.0	NA	250
SRISS-6-WT	12/22/1998	<5.0	<0.45	NA	160
SRISS-7-MP	12/21/1998	5.5	<0.45	NA	200
SRISS-7-WT	12/21/1998	<5.0	<0.45	NA	59
SRISS-8-MP	12/21/1998	<5.0	<0.65	NA	74
SRISS-8-WT	12/21/1998	<5.0	<0.65	NA	96
SRISS-9-MP	12/22/1998	<5.0	<0.45	NA	39
SRISS-9-WT	12/22/1998	<5.0	<0.45	NA	35

TABLE A-2

SOIL SAMPLE ANALYTICAL RESULTS
DECEMBER 14-18, 21, AND 22, 1998
NORMANDY PARK APARTMENTS
for
GULF COAST RECYCLING

Sample Designation	Sample Date	Metal Concentration (milligrams per kilogram)			
		Antimony	Arsenic	Cadmium	Lead
SRISS-10-MP	12/22/1998	<5.0	<0.45	NA	190
SRISS-10-WT	12/22/1998	<5.0	<0.45	NA	280
SRISS-11-MP	12/21/1998	8.8	1.5	NA	450
SRISS-11-WT	12/21/1998	<5.0	0.71	NA	210
SRISS-12-MP	12/16/1998	<5.0	0.66	NA	130
SRISS-12-WT	12/16/1998	<5.0	<0.45	NA	74
SRISS-13-MP	12/22/1998	<5.0	<0.45	NA	13
SRISS-13-WT	12/22/1998	<5.0	<0.45	NA	68
SRISS-14-MP	12/16/1998	<5.0	<0.45	NA	36
SRISS-14-WT	12/16/1998	<5.0	<0.45	NA	14
SRISS-15-0/1	12/22/1998	<5.0	0.62	NA	230
SRISS-15-MP	12/22/1998	<5.0	<0.45	NA	59
SRISS-15-WT	12/22/1998	<5.0	<0.45	NA	54
SRISS-16-MP	12/22/1998	<5.0	<0.45	NA	120
SRISS-16-WT	12/22/1998	<5.0	<0.45	NA	200
SRISS-17-0/4"	12/18/1998	43	7.8	NA	2200
SRISS-17-1.5	12/18/1998	470	85	NA	38000
SRISS-18-0/4"	12/18/1998	46	4.6	NA	1300
SRISS-18-MP	12/18/1998	14	0.71	NA	490
SRISS-18-4	12/18/1998	110	18	NA	7800
SRISS-19-0/1	12/21/1998	15	2.2	NA	750

TABLE A-2

SOIL SAMPLE ANALYTICAL RESULTS
DECEMBER 14-18, 21, AND 22, 1998
NORMANDY PARK APARTMENTS
for
GULF COAST RECYCLING

Sample Designation	Sample Date	Metal Concentration (milligrams per kilogram)			
		Antimony	Arsenic	Cadmium	Lead
SRISS-19-MP	12/21/1998	<5.0	0.88	NA	280
SRISS-19-WT	12/21/1998	<5.0	0.46	NA	150
SRISS-20-0/1	12/21/1998	12	2.0	NA	700
SRISS-20-WT	12/21/1998	<5.0	0.91	NA	210
SRISS-21-0/1	12/21/1998	5.8	0.75	NA	330
SRISS-21-WT	12/21/1998	<5.0	<0.45	NA	220
SRISS-22-MP	12/22/1998	<5.0	<0.65	NA	170
SRISS-22-WT	12/22/1998	<5.0	<0.45	NA	46
SRISS-23-0/1	12/16/1998	<5.0	0.54	NA	70
SRISS-23-MP	12/16/1998	<5.0	0.47	NA	41
SRISS-23-WT	12/16/1998	<5.0	<0.45	NA	21
SRISS-24-0/1	12/22/1998	<5.0	<0.65	NA	82
SRISS-24-MP	12/22/1998	<5.0	<0.65	NA	8.7
SRISS-24-WT	12/22/1998	<5.0	<0.65	NA	8.1
SRISS-25-MP	12/22/1998	<5.0	<0.65	NA	33
SRISS-25-WT	12/22/1998	<5.0	<0.65	NA	17
SRISS-26-MP	12/22/1998	<5.0	<0.65	NA	5.0
SRISS-26-WT	12/22/1998	<5.0	<0.65	NA	2.2
SRISS-27-MP	12/21/1998	<5.0	<0.65	NA	33
SRISS-27-WT	12/21/1998	<5.0	<0.65	NA	8.9

TABLE A-2

SOIL SAMPLE ANALYTICAL RESULTS
DECEMBER 14-18, 21, AND 22, 1998
NORMANDY PARK APARTMENTS
for
GULF COAST RECYCLING

Sample Designation	Sample Date	Metal Concentration (milligrams per kilogram)			
		Antimony	Arsenic	Cadmium	Lead
SRISS-28-0/1	12/21/1998	31	4.4	NA	1200
SRISS-28-MP	12/21/1998	45	8.2	NA	1600
SRISS-28-WT	12/21/1998	15	2.4	NA	1100
SRISS-29-MP	12/21/1998	<5.0	<0.65	NA	8.7
SRISS-29-WT	12/21/1998	<5.0	<0.65	NA	7.3
SRISS-30-0/1	12/21/1998	<5.0	0.56	NA	280
SRISS-30-MP	12/21/1998	<5.0	<0.45	NA	180
SRISS-30-WT	12/21/1998	<5.0	<0.45	NA	89
SRISS-31-0/1	12/18/1998	26	2.0	NA	1700
SRISS-31-MP	12/18/1998	4.5	<0.45	NA	250
SRISS-32-0/1	12/18/1998	3.3	0.50	NA	210
SRISS-32-MP	12/18/1998	<5.0	<0.45	NA	28
SRISS-32-WT	12/18/1998	<5.0	<0.45	NA	22
SRISS-33-MP	12/21/1998	<5.0	<0.45	NA	47
SRISS-33-WT	12/21/1998	<5.0	<0.45	NA	22
SRISS-34-MP	12/21/1998	<5.0	<0.45	NA	110
SRISS-34-WT	12/21/1998	<5.0	<0.45	NA	16
SRISS-35-MP	12/15/1998	<5.0	0.54	NA	26
SRISS-35-WT	12/15/1998	<5.0	<0.45	NA	<5.0
SRISS-36-MP	12/15/1998	<5.0	0.54	NA	29
SRISS-36-WT	12/15/1998	<5.0	0.53	NA	32

TABLE A-2

SOIL SAMPLE ANALYTICAL RESULTS
DECEMBER 14-18, 21, AND 22, 1998
NORMANDY PARK APARTMENTS
for
GULF COAST RECYCLING

Sample Designation	Sample Date	Metal Concentration (milligrams per kilogram)			
		Antimony	Arsenic	Cadmium	Lead
SRISS-37-0/1	12/16/1998	72	22	NA	2300
SRISS-37-MP	12/16/1998	9.8	12	NA	140
SRISS-37-WT	12/16/1998	5.0	1.7	NA	73
SRISS-38-MP	12/15/1998	10	2.5	NA	310
SRISS-38-WT	12/15/1998	<5.0	1.2	NA	160
SRISS-39-MP	12/15/1998	47	36	NA	480
SRISS-39-WT	12/15/1998	7.2	12	NA	64
SRISS-40-0/1	12/18/1998	23	11	<0.50	790
SRISS-40-MP	12/18/1998	81	19	<0.50	960
SRISS-40-WT	12/18/1998	100	10	<0.50	6400
SRISS-41-0/1	12/18/1998	34	5.9	<0.50	1900
SRISS-41-MP	12/18/1998	380	6.4	<0.50	6200
SRISS-41-WT	12/18/1998	9.9	1.6	<0.50	320
SRISS-42-0/1	12/18/1998	150	27	0.54	7000
SRISS-42-MP	12/18/1998	520	57	1.8	20000
SRISS-42-WT	12/18/1998	350	140	1.4	11000
SRISS-43-0/1	12/17/1998	94	16	<0.50	4100
SRISS-43-MP	12/17/1998	27	4.0	<0.50	27
SRISS-43-WT	12/17/1998	8.3	1.3	<0.50	410
SRISS-44-0/1	12/17/1998	100	24	<0.50	2900

TABLE A-2

SOIL SAMPLE ANALYTICAL RESULTS
DECEMBER 14-18, 21, AND 22, 1998
NORMANDY PARK APARTMENTS
for
GULF COAST RECYCLING

Sample Designation	Sample Date	Metal Concentration (milligrams per kilogram)			
		Antimony	Arsenic	Cadmium	Lead
SRISS-44-MP	12/17/1998	100	18	0.52	4300
SRISS-44-WT	12/17/1998	85	10	<0.50	17000
SRISS-45-MP	12/14/1998	17	2.2	NA	720
SRISS-45-WT	12/14/1998	<5.0	<0.45	NA	9.6
SRISS-46-MP	12/14/1998	<5.0	2.8	NA	54
SRISS-46-WT	12/14/1998	5.8	1.9	NA	<5.0
SRISS-47-MP	12/14/1998	<5.0	1.3	NA	46
SRISS-47-WT	12/14/1998	<5.0	<0.45	NA	21
SRISS-48-0/1	12/14/1998	13	1.6	NA	890
SRISS-48-MP	12/14/1998	5.9	1.3	NA	420
SRISS-48-WT	12/14/1998	<5.0	<0.45	NA	<5.0
SRISS-49-0/1	12/18/1998	<5.0	1.1	NA	71
SRISS-49-2	12/18/1998	<5.0	<0.45	NA	11

Notes: 0/1 = sample collected from the upper one foot of soil
MP = mid-point sample
WT = water table sample
NA = not analyzed
Sample locality 49 is a stormwater retention area, samples evaluated as sediment

APPENDIX B

Responsiveness Summary

APPENDIX B
Responsiveness Summary
Normandy Park Apartments Site

The public comment period on the draft proposed plan for the Normandy Park Apartments site was held from February 17 to March 17, 2000. The comments received during this time are summarized below. This responsiveness summary addresses the comments received during the public comment period.

1. What will be done to address soil contamination underneath the buildings and underneath the existing caps which were placed during the removal action?

   EPA Response: Currently existing structures such as the buildings, parking lots, and concrete caps installed as part of the earlier removal action, prevent the potential for exposure to the soil underneath. Institutional controls will be used as part of the remedy to require EPA and FDEP approval prior to disturbing the structures. If the structures are disturbed in the future, the contaminated soil underneath will have to be treated and/or disposed of in accordance with the applicable regulations.

2. Why is the exposed soil only being excavated to two feet?

   EPA Response: The State of Florida considers the top two feet of soil to be surface soil. Surface soil is considered to be the soil that people are likely to come in contact with as a result of normal, day to day activities.

3. What measures will be taken during the remedial action to prevent a sinkhole from forming? A large sinkhole recently formed very near the apartments.

   EPA Responses: During the remedial design phase, the remedy will be designed so that existing structures, such as buildings, sidewalks and the swimming pool are not damaged by the soil removal. Sinkholes cannot always be anticipated. However, it is not expected that the removal of two feet of soil will cause the formation of a sinkhole. Additionally, it is not anticipated that the removal of soil in the southern courtyard will cause the formation of a sinkhole.

4. Why is the groundwater being cleaned up when residents of the apartment complex drink municipal water?

   EPA Responses: The Superfund law requires EPA to remediate sites based on both current exposure and potential future exposure. The State of Florida requires that the surficial aquifer be viewed as a potential source of drinking water. Therefore, drinking water standards must be met in the surficial aquifer as well as the deeper Floridan aquifer.

5. What will be done during excavation of the soil to prevent soil contaminants from becoming airborne? Will there be any indoor sampling done during the excavation?

EPA Response: The remedy will be designed to limit the potential for exposure to dust resulting from the excavation of contaminated soil. Gulf Coast Recycling agreed to do some indoor sampling during the excavation to ensure that dust from the excavation is not entering the apartments.

6. Will a more permanent measure be taken in the sandbox?

EPA Response: The intent of this remedy is to completely remove the potential for exposure to contaminants in the surface soil. The remedy will be designed to ensure exposure to the surface soil will not occur. This includes the sandbox and playground areas.

7. Until the remedial action is complete, what is being done to protect residents?

EPA Response: The prior EPA action in 1992, was taken to address the immediate threat posed by exposure to contaminants. In this action, concrete caps were placed over contaminated soil in the northern courtyard and a wooden deck was constructed in the southern courtyard to prevent exposure to the soil underneath. The Public Health Assessment developed by the Florida Department of Health found that there was no current health risk associated with the contaminated soil because exposure to the soil was being prevented. Therefore, the actions which were previously taken currently protect residents from the soil contaminants. This EPA action is being taken to implement a long term remedy which will also address future potential exposures.

8. Is the risk associated at this site so bad as to justify the disturbance required to clean it up?

EPA Response: Yes. The human health risk assessment developed for this site found that a level of 420 mg/kg of lead in the soil is the maximum concentration associated with an acceptable risk. Lead is found at various areas throughout the complex above this level and therefore, poses and unacceptable long term risk. Additionally, the drinking water standards for antimony and lead have been exceeded in the groundwater. EPA and Gulf Coast Recycling have made every effort to develop a remedy which will remediate these problems while minimizing the impact on the residents.